TI 801-02
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US Army Corps
of Engineers

# Technical Instructions

## Family Housing

Volume 2: Model Request for Proposals

Headquarters
U.S. Army Corps of Engineers
Directorate of Military Programs
Engineering and Construction Division
Washington, DC 20314-1000

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**REQUEST FOR PROPOSALS**
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**NOTES**

1. See additional tables of contents in each section for paragraph references. See the Technical Specifications table of contents for specification sections included in this solicitation/contract.

2. Drawings are provided as a separate package.

**NOTES TO USACE ACTIVITY PREPARING SOLICITATION**

1. Contracting guidance contained herein should not be used as a substitute for thorough knowledge of the current acquisition regulations. If a conflict arises between this guidance and the acquisition regulations, the acquisition regulations govern.

2. Local provisions and clauses may be substituted.

3. General Wage Decisions, although not specifically listed as an attachment to the Statement of Work must be included in the complete solicitation.

**SECTION 00010**
**SOLICITATION, OFFER AND AWARD (STANDARD FORM 1442) AND PRICING SCHEDULE**

SECTION 00010 Solicitation Contract Form

| ITEM NO | SUPPLIES/SERVICES | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 0001 | For the complete design and construction of [USACE Design District to complete for project being advertised] family housing units and supporting facilities at [USACE Design District to indication Installation and location] with a 120 day acceptance period. | | | | |

| ITEM NO | SUPPLIES/SERVICES | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 0001AA | All construction work on the _____ New Family Housing units in Item 0001 within the five (5) foot line (includes all work inside of a line drawn at a perpendicular distance of five feet outside of the exterior face of foundation walls). | 1.00 | Lump Sum | | |

NET AMT

| ITEM NO | SUPPLIES/SERVICES | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 0001AB | All construction work outside of the five (5) foot line, excluding Items 0001AC, 0001AD, and 0001AE. | 1.00 | Lump Sum | | |

NET AMT

| ITEM NO | SUPPLIES/SERVICES | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 0001AC | | 1.00 | Lump Sum | | |

Design work for all items (construct new family housing units, and all other features required by the RFP)

NET AMT

| ITEM NO | SUPPLIES/SERVICES | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 0001AD | | 1.00 | Lump Sum | | |

Demolition of existing housing units and associated site improvements. [USACE Design District to include this bid item only when demolition is included in the project.}

NET AMT

| ITEM NO | SUPPLIES/SERVICES | QUANTITY | UNIT | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 0001AE | | 1.00 | Lump Sum | | |

Construction of recreation facilities complete, including all work incidental thereto as required by the statement of work.

NET AMT

**3. NOTES.**

a. The Army will procure this housing through a design and cost competition in accordance with the provisions set forth in this Request for Proposals (RFP). When a contract is awarded, it will be a "Firm Fixed Price Contract."

b. The Congress, in authorizing and funding this contract, has established certain cost limitations for the project. The current authorization for the complete design and construction of this project is [Dollars]. [This dollar figure is provided by HQUSACE by directive when authority to advertise and Code 6 are authorized.] Proposals that exceed this funding limit after exercising any options may be rejected. Submission of desirable alternative features exceeding minimum requirements may be considered as long as award can be made within the established funds.

c. Any proposal which is materially unbalanced as to prices for the Base Schedule may be rejected. An unbalanced proposal is one which is based on prices significantly less than the cost for some work and prices which are significantly overstated for other work and can also exist where only overpricing or underpricing exists. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

d. Failure to insert prices for each item in the Base Schedule and each item in the Additive Schedule may cause the proposal to be rejected.

e. The offeror agrees if he or she is awarded a contract under this RFP, which includes any additive items, that the Government reserves the right to reinstate any additive item(s) into the contract at any time up to 120 calendar days after notice to proceed, provided that such reinstatement would not alter the original determination of the successful offeror. If an additive item is reinstated in the contract, it is also agreed that the reinstated price will be the same as the schedule price.

**SECTION 00100**
**INSTRUCTIONS, CONDITIONS AND NOTICES TO BIDDERS/OFFERORS**

**SECTION 00100**
**Bidding Schedule/Instructions to Bidders**

Note: SPS and titled paragraphs provide example text. FAR and DFAR paragraphs are shown only for reference. All contractual information and requirements must be coordinated and produced through the PDT Contract Specialist. This TI is not meant to serve as contracting authority or direction.

| PARAGRAPH | DESCRIPTION |
|---|---|
| 52.204-6 | DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUN 99) |
| 52.215-1 | INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (NOV 1999) |
| 52.222-23 | NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999) |
| 52.225-12 | NOTICE OF BUY AMERICAN ACT REQUIREMENT-- CONSTRUCTION MATERIALS (MAY 1997) |
| 52.233-2 | SERVICE OF PROTEST (AUG 1996) |
| 52.225-13 | NOTICE OF BUY AMERICAN ACT REQUIREMENT-- CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS ACT AND NORTH AMERICAN FREE TRADE AGREEMENT (MAY 1997) - ALTERNATE I (MAY 1997) |
| 52.236-28 | PREPARATION OF PROPOSALS--CONSTRUCTION (OCT 1997) |
| 52.252-1 | SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998) |
| 52.252-5 | AUTHORIZED DEVIATIONS IN PROVISIONS (APR 1984) |

***BASIS OF AWARD***

*Below is sample wording, explaining the "Basis of Award" for a design-build contract. This sample describes the Best Value Trade-Off Approach. This information may be included in the Design-Build RFP in Section 00120, "PROPOSAL EVALUATION CRITERIA."*

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BASIS OF AWARD :

XX.1. The Government will award a firm fixed-price contract to that responsible Offeror whose proposal, conforming to the solicitation, is fair and reasonable, and has been determined to be most advantageous to the Government, quality (comprised of technical approach and performance capability factors), price and other factors considered. The rated/scored technical evaluation criteria and price are considered approximately equal. As technical scores and relative advantages and disadvantages become less distinct, differences in price between proposals are of increased importance in determining the most advantageous proposal. Conversely, as differences in price become less distinct, differences in scoring and relative advantages and disadvantages between proposals are of increased importance to the determination.

XX.2. The Government reserves the right to accept other than the lowest priced offer. The right is also reserved to reject any and all offers. The basis of award will be a conforming offer, the price or cost of which may or may not be the lowest. If other than the lowest priced offer is accepted, that offer must be sufficiently more advantageous than the lowest priced offer to justify the payment of additional amounts.

XX.3. Offerors are reminded to include their best technical and price terms in their initial offer and not to automatically assume that they will have an opportunity to participate in discussions or be asked to submit a revised offer. The Government may make award of a conforming proposal without discussions, if deemed to be within the best interests of the Government."

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**SECTION 00110**
**PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS**

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## 1.00 PROPOSAL SUBMISSION INSTRUCTIONS.

a. General. Inasmuch as the technical proposal will describe the capability of the offeror to perform any resultant contract, it should be specific and complete in every detail. The proposal should be prepared simply and economically, providing straight-forward, concise delineation of capabilities to perform satisfactorily the contract being sought. The proposal should therefore be practical, legible, clear and coherent.

b. Format of Technical Proposals. In order that the evaluation may be accomplished strictly on the merit of the material submitted, no dollar amounts for the proposed work are to be included in the technical proposal. In order that the technical evaluation may be accomplished efficiently, the technical evaluation criteria listed below in this section are to be addressed in order. If supplemental information relative to the criteria is included in another part of the technical proposal, its location must be identified. **WARNING:** The proposals are evaluated in direct correspondence to the technical evaluation criteria which are included in Section 00120. It is in the best interest of the offerors to format the technical proposal in the order of the technical evaluation criteria. If the offeror fails to provide information relating to the criteria or locates the information in another part of the proposal without providing any cross references, the offeror runs the risk of having their proposal receive a lower evaluation by the Government evaluators who were not able to locate the appropriate information.

c. The technical proposal shall contain:

(1) Title Page, including the title of the solicitation, solicitation number, [offeror number (Where used) or name], and date of the submittal.

(2) Table of Contents, including a list of tables, drawings, maps or exhibits.

(3) Compliance Statement: The offeror is required to certify that all items submitted in the technical proposal comply with the RFP requirements and any differences, deviations or exceptions must be stated and explained. Offerors are required to complete the statement and submit it with their technical proposal. Even if there are no differences, deviations or exceptions, the offeror must submit the Compliance Statement and state that none exist.

Statement of Compliance:

This proposer hereby certifies that all items submitted in this proposal and final design documents (after contract award) comply with the solicitation requirements. The criteria specified in Solicitation No. [Insert Solicitation Number] are binding contract criteria and in case of any conflict after award, between [Insert Solicitation Number] and the contractor's proposal, the solicitation criteria shall govern unless there is a written and signed agreement between the contractor and the Government waiving a specific requirement. Should this proposal result in the award of a contract, this statement will be included on each sheet of drawings and on the cover of the specifications.

*[Design District Notes: The requirements of this paragraph are not mandatory for use in solicitations but are provided in this TI for use in projects where blind technical scoring is considered advantageous or necessary]*

(4) Requirements for Special Marking of Proposals. Proposers are advised that the technical evaluation and rating of the proposals are conducted in strict confidence and that technical evaluation personnel and consultants review and rate each proposal without knowledge of the name of the proposer, including his/her A-E, or the price offered. Accordingly, proposer identification **MUST NOT APPEAR** on any technical documents for evaluation. The Army will assign proposal numbers prior to submission of

proposals. To receive a proposal identification number contact the [Insert USACE Design District] Contracting Division at [Insert USACE Design District Contracting Division Phone Number]. Proposal identification numbers will be issued following written requests only. This number is to be used by each proposer to identify the technical portions of the proposal. The proposers name, address, signature, etc. as well as the assigned identification number, should only be inserted, as appropriate, on transmittal letters, pricing bonds, etc., required by this solicitation.

d. Exceptions to the contractual terms and conditions of the solicitation (e.g., standard company terms and conditions) must not be included in the proposal.

e. The technical proposal shall not include any cost information. The technical and cost proposals shall be submitted as two separate documents.

**2.00 PROPOSAL REQUIREMENTS:**

a. Who May Submit.

(1) Proposals may be submitted by: firms formally organized as design/build entities, or by design firms and construction contractors that have associated specifically for this project. In the latter case, a single design firm or construction contractor may offer more than one proposal by entering into more than one such association. For the purpose of this solicitation, no distinction is made between formally organized design/build entities and project-specific design/build associations. Both are referred to as the design/build offeror, (or simply "offeror"), or the design/build contractor, (or simply "Contractor"), after award of a contract.

(2) Any legally organized offeror may submit a proposal, provided that the offeror, or offeror's subcontractor, has on its permanent staff professional architects and engineers registered in the appropriate technical disciplines and provided that the requirements specified in the solicitation are met. All designs must be accomplished under the direct supervision of appropriately licensed professionals.

b. General Requirements.

(1) In order to effectively and equitably evaluate all proposals, the Contracting Officer must receive information sufficiently detailed to clearly indicate the materials, equipment, methods, functions, and schedules proposed.

(2) In addition to the design documents addressed below, proposals must contain financial terms and schedules for design and construction, a management plan, background information regarding the offerors' qualifications, and the representations and certifications. Specific requirements are described below.

c. Size of Printed Matter Submissions.

(1) Written materials: Size A4 [or 8-1/2" x 11"] format.

(2) Drawing sheets: Use Size A1 [approximately 24" x 36"] for full size drawings which are not intended for reduction to half-size sets. Half size sheets size A2 [approximately 16" x 23"] are also acceptable.

d. Where to Submit. Offerors shall submit their proposal packages to the [USACE Design District] at the address shown in Block 8 of Standard Form 1442.

e. Submission Deadline. Proposals shall be received by the [USACE Design District] no later than the time and date specified in Block 13 of Standard Form 1442.

f. Proposal Requirements and Submission Format. The proposals sought by this solicitation shall contain three categories of submittal information as follows:

(1) Design-Technical. This information shall be submitted in separate three-ring binders labeled "Design-Technical Information." This category consists of design documents, drawings, calculations, specifications, design analysis, catalog cuts, and other information. Design Technical materials shall also include a spreadsheet or tabular listing of the Evaluation Factors for Technical Proposals included in Section 0120 and identify where in the proposal materials that specific item is addressed. Provide six (6) copies of the drawings (size A1); or six (6) copies of half size drawings (size A2) with a minimum of one full size set; 1 set of color boards; and six (6) copies of catalog cuts and other technical data. The drawings shall be bound.

(2) Offeror past performance. This information shall be submitted in separate three-ring binders labeled "Offeror Past Performance" or may be included in the "Offeror Project Team and Performance Plans" binder required in paragraph (3). Provide original and three copies.

(3) Offeror project team and performance plans. This information shall be submitted in separate three-ring binders labeled "Offeror Project Team and Performance Plans." Provide original and three copies.

(4) Pro Forma requirements. This information should be submitted in an envelope labeled "Pro Forma Requirements." This category consists of representations and certifications, subcontracting plan, proposal bonds, completed Standard Form 1442, and schedule of proposed prices. Provide original and three (3) copies.

(5) The proposals shall contain a detailed table of contents. If more than one binder is used, the complete table of contents shall be included in each. Any materials submitted but not required by this solicitation, (such as company brochures), shall be relegated to appendices.

g. Required Technical Data for Proposal Submission. The following technical data shall be submitted as part of the formal proposal. Proposals shall include graphic description of the design included in the basic proposal clearly indicated as such. All alternate designs shall be graphically described on separate drawings from the basic proposal. Offerors are advised that the required data listed below will be utilized for technical review and evaluation and used for determination of a "Quality Rating" by a Technical Evaluation Team. Materials indicated in the design/construction criteria, but not indicated in the offeror's specifications, will be assumed to be included and a part of the proposal.

(1) Design drawings. Provide an index of drawings. If required drawings are common for more than one type of building or dwelling unit, indicate so on the drawing. Do not provide foundation plans or structural, civil, plumbing, mechanical, or electrical details. The proposal design drawings shall provide the information as indicated in the following tables:

SITE DESIGN

| Drawing Type / Scale | Show This Information |
|---|---|
| Area Site Development Plan 1:1000 [1"=80'] Note[1,2] | Spatial and functional arrangement of all family housing requirements<br>Adjacent land uses and historical or environmental conditions<br>Project Boundaries<br>Existing Contours<br>Proposed contours at 1 m intervals [3'].<br>Drainage and water retention ponds (if utilized)<br>Vehicular and pedestrian circulation<br>Housing types to include patios and fencing<br>Children's outdoor play areas |
| Typical Cluster Plans 1:500 [1"=40'] Note[1,2] | Solar orientation of each housing unit or cluster<br>Vehicular and pedestrian circulation<br>Spacing between housing units<br>Utilities and utility entrance into housing unit walls<br>Children's play lots |
| Demolition Plan 1:500 [1"=40'] | All site amenities, structures, or features to be removed or retained. |
| Site Plan 1:500 [1"=40'] | Layout for all site requirements. Show "Use Zones" in children's outdoor play areas. |
| Typical Landscape Planting Plans 1:250 [1"=20'] | Botanical/Common Names of plants used, size, and quantity of trees, shrubs, ground covers, related notes, and planting details. |
| Utility Plan 1:500 [1"=80'] | All site utility requirements.<br>Site lighting.<br>Primary cable routing (new and existing).<br>Pad-mounted transformers and service laterals.<br>Cable television and telephone routing. |
| Off-Site Electrical Plan 1:5000 [1"=400'] Scale as required (If applicable) | Location of primary supply point of take-off.<br>Existing electrical lines, both overhead and underground, properly identified.<br>New construction tie-in to on-site electrical distribution system. |

Note[1]: Drawings shall be dimensioned to show building separations, set back, etc.
Note[2]: Metric Scales are preferred, however, inch pound scales may continue to be used if they enhance competition.

HOUSING UNIT DESIGN

| Drawing Type / Scale | Show This Information |
|---|---|
| Floor Plans<br>1:50 [1/4" = 1'-0"]<br>(For each dwelling unit type) | Overall dimensions.<br>Room description with dimensions and areas.<br>Appliances (including occupant-owned washer and dryer).<br>Plumbing fixtures and vanities.<br>Kitchen layout.<br>Door swings.<br>Garage features.<br>Patio.<br>Exterior bulk storage.<br>Service (trash) area.<br>Furnace and hot water heater location.<br>Calculated gross and net floor areas. |
| Typical<br>Exterior Elevations<br>1:50 [1/4"=1'-0"] | Show all sides. |
| Typical<br>Interior Elevations<br>1:50 [1/4"=1'-0"] | Kitchens and bathrooms. |
| Transverse and Longitudinal Sections<br>1:50 [1/4"=1'-0"] | Typical structural system.<br>Building materials.<br>Finishes.<br>Vertical dimensions. |
| Typical Wall Sections<br>1:20 [3/4"=1'-0"] | Typical wall, foundation, floor, and roof section.<br>Materials. Cavity wall. Party wall.<br>Wall fire and STC ratings |
| Details<br>Scale as required. | Special Features |
| Finish Schedule | All rooms. |

Note: Metric Scales are preferred, however, inch pound scales may continue to be used if they enhance competition.

UNIT ENGINEERING

| Drawing Type / Scale | Show This Information |
|---|---|
| Mechanical Floor Plan<br>1:50 [1/4"=1'-0"]<br><br>Note: This information may be shown on the unit electrical plans if it can be shown clearly. | HVAC system layout. Flues. Plumbing vents.<br>Hot water heater.<br>Equipment Efficiencies<br>Active Ventilation System<br>Other Energy Conservation Features Included in the Proposal |

UNIT ENGINEERING

| Drawing Type / Scale | Show This Information |
|---|---|
| Electrical Floor Plan<br>1:50 [1/4"=1'-0"] | Lighting fixture locations, properly labeled to show type of fixture.<br>Fixture schedule which indicates general fixture description, number and type of lamps, type of mounting, and any special features.<br>Switch locations. Convenience outlet locations.<br>Smoke detector locations. Telephone outlet locations.<br>Cable TV outlet locations, Carbon Monoxide Detector locations.<br>Location of motors or special mechanical equipment.<br>Location of unit load center panelboards.<br>Location of multi-unit service equipment and building service.<br>Multi-unit electrical riser diagram.<br>Electrical legend and notes. Room names. |

Note: Metric Scales are preferred, however, inch pound scales may continue to be used if they enhance competition.

(2) Specifications. Complete Attachment No. 2, Outline Specification, indicating the quality of materials, construction, finishes, fixtures, and equipment for the applicable items. Special attention should be given to the identification and specification of energy conservation features included in the proposal, particularly those which exceed the minimum requirements of the Statement of Work. Submit as part of the Design-Technical Information.

(3) Equipment Schedule. Equipment schedule shall indicate type of equipment, size or capacities, manufacturer, and model number. Furnish manufacturer's catalog data on equipment and fixtures for all features of the housing unit, this shall include appliances, electrical equipment and lighting, mechanical heating and cooling equipment, domestic water system equipment, as well as catalog information on the finishes and architectural specialties and exterior finish materials. Originals of manufacturer's catalog should be submitted in lieu of reproducibles to ensure legible data. Submit as part of the Design-Technical Information.

(4) Color Boards. Coordinated interior and exterior color schemes. Three schemes are required. For proposal evaluation provide one copy of each scheme complete with samples and/or chips of the colors, materials, textures, and finishes.

(5) Calculations Required for Certification. Net area and other calculations are required for certifications to assure that designs fall between the minimum and maximum net area limitations indicated in the statement of work. Net area is also a factor evaluated for technical quality. Other calculations are also required in the statement of work. Use the format provided in Attachment 3, Format for Required Calculations. Submit as part of the Design-Technical Information.

(6) Evaluation Factors/Proposal Contents Listing. A spreadsheet or table consisting of all the evaluation categories and sub-categories listed in Section 0120 for technical proposal evaluation and specific reference to where in the proposal documents those requirements are addressed or indicated. Submit as part of the Design-Technical Information.

h. Offeror past performance. Complete Attachment No. 4, Proposal Data Sheet. Offeror's past performance will be evaluated as part of this one-step competitive negotiation procurement process. Offerors shall submit the following as part of their proposals.

(1) Project examples. Provide examples (at least three) of projects for which the offeror has been responsible. The examples should be as similar as possible to this solicitation in project type and scope. Provide references (with contract names and telephone numbers) for all examples cited. Each example shall indicate the general character, scope, location, cost, and date of completion of the project. If the offeror represents the combining of two or more companies for the purpose of this RFP, each company shall list project examples.

i. Offeror project team and performance plans. Complete Attachment No. 4, Proposal Data Sheet. Offeror's proposed project team and performance plans will be evaluated as part of this one-step competitive negotiation procurement process. Offerors shall submit the following as part of their proposals.

(1) Personnel. Provide the names, resumes, and levels of responsibility of the principal managers and technical personnel who will be directly responsible for the day-to-day design and construction activities. Include, as a minimum, the project manager; the project architect; the engineers responsible for civil, electrical, mechanical and structural design; the quality control manager; and the construction manager. Indicate whether each individual has had a significant part in any of the project examples cited. If reassignment of personnel is considered possible, provide the names and resumes of the alternative professionals in each assignment.

(2) Management Plan. The offeror shall provide a Management Plan. This is an overall plan showing how the offeror will control the job. The term "management plan" is defined as a plan that includes the following subplans: Quality Control Plan; Design Schedule; Construction Schedule; and Contract Closeout Plan. As part of its Management Plan, the offeror shall submit a Design Schedule and Construction Schedule for all phases of the project. The offeror shall also submit a rationale explaining how the schedules will be achieved. The schedule for construction shall be task oriented, indicating dates by which milestones are to be achieved. The offeror may use a critical path or other method of his/her choice; however, the schedules shall be graphically represented. A Closeout Plan shall be furnished in a brief structured time scale schedule reflecting the planned activities during the final 90 days of the contract activity. Items to be included are as follows:

CLOSEOUT PLAN

| |
|---|
| Testing of equipment and systems with schedules and reports. |
| Equipment instruction and training schedules. |
| O&M Manuals transfer. |
| As-built drawings transfer. |
| Transfer procedures and schedules. |
| Pre-final inspection procedures and correction of deficiencies. |
| Warranty data submission and planned implementation. |
| Cleanup of administrative deficiencies. |
| Move off site. |

(3) Quality Control Plan. The Quality Control Plan is part of the Management Plan. The alliance of the project designer and builder on a project such as this naturally removes one commonly used method of quality control; that is, the usual reliance on the owner or the design consultant for monitoring construction quality. Although the Government will provide an on-site representative during construction, offerors are expected to develop a formal program of monitoring to ensure a high level of construction quality. Offerors shall submit Quality Control Plans that respond to the minimum requirements of

Technical Specifications Section 01451 (furnished with this RFP package) entitled "Contractor Quality Control Design/Build." The offeror's program shall have the following characteristics:

CONTRACTOR QUALITY CONTROL REQUIREMENTS

| |
|---|
| A clear identification of the personnel responsible for quality control and a clear policy establishing their authority. The quality control group shall be separate and apart from (not the same) the people that are doing the construction. This quality control group shall report to the Contractor's management at a level no lower than a vice president of the company. |
| A specific description of the tasks and functions of the quality control personnel. |
| A specific policy establishing schedules for the performance of quality control tasks. |
| A policy for reporting quality control findings to the Contracting Officer. |
| A procedure whereby the Contracting Officer may resolve disputes that have not received satisfactory responses from the first levels of quality control personnel. |
| The names of testing laboratories to be used and the procedures for test data reporting. |
| A plan for material storage and protection. |

i. Nonresponsive proposals. Failure to submit all the data indicated in this section may be cause for determining a proposal nonresponsive and, therefore, not considered for technical evaluation or award.

**SECTION 00120**
**PROPOSAL EVALUATION AND CONTRACT AWARD**

**SECTION 00120**
**PROPOSAL EVALUATION AND CONTRACT AWARD**

***[Design District must coordinate this section with the preparation and completion of the technical evaluation manual in accordance with the Attachments to Volume 1.]***

## 1. TECHNICAL EVALUATION.

The major factors of consideration in the technical evaluation of family housing proposals are as follows:

FACTOR 1 HOUSING UNIT DESIGN: This factor is the most important factor representing approximately 36% of the total value of the five factors.

FACTOR 2 HOUSING UNIT ENGINEERING: This factor is the second most important factor and is given approximately 70% of the weight of Factor 1 in the evaluation.

FACTOR 3 SITE DESIGN: This factor is the third most important factor and is given approximately 56% of the weight of Factor 1 in the evaluation.

FACTOR 4 SITE ENGINEERING: This factor is the fourth most important factor and is given approximately 24% of the weight of Factor 1 in the evaluation.

FACTOR 5 OFFEROR PAST PERFORMANCE: This factor is approximately equal in weight to Factor 4 with 24% of the weight of Factor 1.

FACTOR 6 OFFEROR PROJECT TEAM AND PERFORMANCE PLANS: This factor is approximately equal in weight to Factor 5 with 24% of the weight of Factor 1.

**FACTOR I: HOUSING UNIT DESIGN.** Housing unit design includes the function and appearance of housing unit materials, exclusive of the purely technical performance of internal engineering systems. The subfactors and elements considered herein deal with the planning and design of the housing units, as well as the durability and thermal performance of the materials. Consideration will be given to: the interaction of the individual housing unit to people; the degree to which the unit blends with those outdoor features of living normally associated with the family; the overall esthetics of the housing unit; and the amenities associated with livability. These latter elements include such items as separation of activities, convenience, logistics, leisure, bathing, food handling, and sleeping. The sub-factors described below will be evaluated in the following order of importance:

<u>Ranking of Sub-Factors</u>

Subfactor **f** is the most important
Subfactor **a** is weighted approximately 66% of the value subfactor **f**.
Subfactors **c** and **g** are each weighted slightly less than 50% of the value subfactor **f**
Subfactors **b, d,** and **e** are each weighted approximately 66% of the value of subfactors **c** and **g**
Subfactors **h, j, l, m, n** are each weighted approximately 50% of the value of subfactors **c** and **g**
Subfactors **l, k, o, p, q** are each weighted approximately 33% of the value of subfactors **c** and **g**

### a. HOUSING UNIT TYPE

The mix of housing unit types will be evaluated on the basis of a formula which assigns each type of housing unit a point value. The relative weight of housing unit types are in listed in descending order of preference: single family detached, duplexes, townhouses, and apartments. Single family detached units receive the most points and apartments receive the least amount of points. The number of each type of

housing unit is then multiplied by the point value for that housing type. The sum of these values is then divided by the total number of housing units to arrive at an average score for the proposal.

**b. NET FLOOR AREA**

Net floor area will be evaluated in the following manner: Proposals which meet the basic net area required are assigned a minimum number of points. Points are added for proposals which include areas in excess of the basic net area, but do not exceed the stated maximum areas. Deductions to the points awarded are made for proposals which include units at less than the basic net area, but which do not fall below the stated minimums. Proposals which include units which do not achieve the stated minimum areas will be considered non-conforming.

**c. EXTERIOR APPEARANCE** The following items will be considered:

(1) Variety in facades, roof lines, and entrances.
(2) Interesting staggering of housing units.
(3) Proportions of fenestration in relation to elevations.
(4) Visual effects of garages on the housing units.
(5) Shadow effects, materials, and textures.
(6) Proportion and scale within the structure.
(7) Other aesthetic considerations.

**d. STORAGE** Consideration will be given to the size, location, and utility of all storage areas including shape of space, finish, lighting, and shelving provided.

(1) Exterior bulk storage.
(2) Interior bulk storage.
(3) Closet (linen, coat, clothing).

**e. VEHICLE STORAGE** Consideration will be given to type of garage proposed, proximity of second parking spaces, and/or covered walkways to the housing units, as well as appropriate treatments with respect to prevailing climatic conditions. This item does not include consideration of space in excess of that required for automobile storage only. Additional space included or integral to garages will be evaluated as storage under the STORAGE sub-element. Aesthetics are considered under EXTERIOR APPEARANCE.

**f. FUNCTIONAL ARRANGEMENT** The following items will be considered in the evaluation of the unit functional arrangement:

(1) Does the floor plan of the housing unit provide convenient circulation between living, food handling, sleeping, and bathing areas?
(2) Does the relationship among the areas enhance flexibility of usage? Consider amenities which enhance the overall interior functions, for example, living, sleeping, food handling, and bathing.
(3) Is an entrance foyer with a closet and visual separation from living areas provided?
(4) Is access provided to functional areas without passing through living spaces? Where circulation is adjacent to living spaces without separation, is a minimum circulation path of 900 mm [3 ft] provided exclusive of the minimum room dimensions?
(5) Is there a balanced relationship in the sizing of these functional areas? Consider the impact of family size on the size and relationship of areas.
(6) Are the logistics of home operation considered, for example, furnishability, furniture movement, circulation of expendable supplies and disposal?
(7) Does the plan enhance indoor and outdoor living in relation to patios, screened porches, vistas, yard areas, and climate.
(8) What other design considerations are provided which enhance the overall livability and amenity of the unit?

**g. LIVING, DINING, AND FAMILY AREAS** (Furnishability and circulation are evaluated under sub-factor f above.) The following interior design elements which enhance the individual and family group aspects of recreation, leisure, and entertainment such as the following, will be considered:

(1) Possibilities for joint use or concurrent separate activities.
(2) Location of convenience elements, for example, light switching, convenience outlets, and TV outlets.
(3) Amenities, such as fireplaces and built-in bookcases.
(4) Living Room
(5) Dining Area
(6) Family Room and Secondary Dining Area

**h. SLEEPING** Consideration will be given to the size and proportions of bedrooms as related to windows, doors, furniture arrangement, and closet access in the area. Access to bedrooms, as well as the relationship to other functional areas, are treated under FUNCTIONAL ARRANGEMENT. Closet size is addressed under STORAGE. The following design issues will be evaluated:

(1) Bedroom size. Quality points added for area and/or dimensions in excess of specified minimums.
(2) Furnishability.
(3) Visual and acoustic privacy.

**i. BATHING** The technical portion of the RFP sets forth the minimum size of full baths, as well as the required and/or desirable fixtures, furnishings, and finishes of the bathrooms. Beyond these design requirements, amenities gained through additional net area, furnishings, layout, and privacy will be considered, including:

(1) Number and size.
(2) Furnishings (e.g., vanities with or without cabinets, other storage, and heat lamps).
(3) Layout (convenience and attractiveness).
(4) Visual and acoustic privacy.

**j. KITCHEN AND FOOD HANDLING** The kitchen is the focal point of activity for the homemaker. Considerable initiative and innovative approaches to the design of the area can be achieved by the offeror to enhance this major logistics and control area. Its relationship to living, dining ingress and egress, and sleeping has been addressed in FUNCTIONAL ARRANGEMENT. Consider the following design issues:

(1) Efficiency of food preparation triangle including the circulation of persons and materials.
(2) Pedestrian and product circulation (controlled basically by relationship of counter space to major appliances).
(3) Size and layout of cabinetry and counter areas. (Add points for area above the minimum requirements.)
(4) Outlet number and placement.
(5) Provision of a space with electrical outlet for an occupant-owned freezer.
(6) Visual privacy.

**k. UTILITY AND WORK AREAS** This sub-element provides for occupant-owned or Government-furnished washers and dryers in an area of the housing unit which provides for efficient product circulation and yet does not infringe on other functions. The occupant owned freezer may also be housed in this area. This sub-element evaluates utility and work space above the minimum requirement, an enclosed washer/dryer space. The overall goal is to provide a space for the washer/dryer, freezer, ironing, and hobbies. Overall functional layout, as it relates to other areas, should be considered under FUNCTIONAL ARRANGEMENT. The following concerns will be evaluated:

(1) Does the area provide efficient work space and work flow without infringing on other functions?
(2) Is the area suitable for ironing and/or light hobby work?
(3) Is the location and layout well designed to accommodate mechanical equipment?

(4) Size and layout.
(5) Provision of shelving, storage, lighting, and convenience outlets.
(6) Location of mechanical equipment with respect to access, convenience, and noise.

**l. EXTERIOR FINISHES** This sub-element evaluates the aesthetics, maintainability, and quality of windows, doors, siding, roofing, soffits, fascia and trim, and exterior painting and stains here. **Proposers are encouraged to review the materials and constructions submitted carefully with respect to Sustainable Design Considerations as listed in the Statement of Work.** Particular attention should be paid to finishes which require the minimum amounts of cyclical maintenance.

**m. THERMAL ENVELOPE** This sub-element evaluates the thermal performance of the following house elements: walls, roof and ceiling, floors and perimeters, windows and glazing, doors, and tightness (reduction of infiltration). The integrity of the thermal envelope is a prime consideration in complying with "Energy Star" program requirements. Proposals which do not comply with the stated minimums will be considered as non-conforming and may be eliminated from further consideration.

**n. INTERIOR FINISHES** The quality, durability, maintainability, and aesthetics for each of the following will be evaluated:

(1) Walls and ceilings.
(2) Flooring.
(3) Shelving, wainscots and moldings.
(4) Kitchen and Bath cabinets and tops. Also consider quantity.
(a) Factory pre-finished laminated (natural wood) is preferred for cabinets.
(b) Laminated plastic with integrally molded backsplash and nosing is preferred for countertops.

**o. COLOR SCHEMES** This sub-element considers the aesthetics and coordination of interior and exterior finish designs.

**p. PATIOS, SERVICE YARDS, AND FENCING** Size, quality of materials, arrangement, and visual appearance of these supporting amenities will be evaluated here.

**q. AMENITIES** This area evaluates desirable features or amenities not required in the SOW (e.g., patio roofs, screened porches, built-in features, bus shelters, or other amenities).

**FACTOR II: HOUSING UNIT ENGINEERING.** In addition to system design, each subfactor evaluates the choice of materials for the systems in terms of life cycle cost effectiveness. Since these new housing units will be "Energy Star" Homes, proposals must include information required to allow the evaluators to determine compliance with the minimum requirements of the solicitation with respect to Energy Conservation. Proposers are encouraged to adopt and/or develop additional means and methods to enhance the performance of the submitted units. Considerations such as durability, corrosion resistance, pest and termite resistance, ease of maintenance, life cycle cost of maintenance, and energy efficiency should be included within the following sub-factors:

<u>Ranking of Sub-Factors</u>

Sub-Factor **d**. is the most important factor and represents 29% of the total points available in this factor.
Sub-Factors **b** and **c** are each weighted approximately 80% of the value of sub-factor **d**.
Sub-Factor **a** is approximately 62% of the value of sub-factor **d.**
Sub-Factor **e** is least important at 22% of sub-factor **d**.

**a. INTERIOR PLUMBING SYSTEM** This element considers piping systems design quality, fixture quality, and water heater size and recovery.

(1) Piping zoning, layout, and isolation

(2) Piping size and material quality
(3) Fixtures and accessories. Evaluate quality and water usage.
(4) Water heater size and recovery. Evaluate quality of water heater with respect to energy conservation. Consideration should be given to power ventilated water heaters as well as sealed combustion water heaters.

**b. INTERIOR ELECTRICAL SYSTEM** This element considers wiring, switching, and panel design (e.g., panel size, number of circuits, provision of spares). Quality points are also given for provision of fixtures, outlets, and switching in excess of minimum requirements.

(1) System design.
(2) Outlet and switch placement and quality.
(3) Fixture quality. Evaluate both aesthetics and energy conservation qualities.
(4) Electrical equipment quality.

**c. HEATING, VENTILATION, AND AIR CONDITIONING** This element considers the quality of heating, ventilating, air conditioning, control systems, and associated equipment design to provide personal comfort in a life cycle cost effective manner.

(1) System design: Supply air distribution
(2) System design: Return air
(3) Kitchen exhaust systems
(4) Air Handling/Furnace system. Consider equipment efficiencies, features, and maintainability.
(5) Condensing unit . Consider equipment efficiencies, features, and maintainability.

**d. ENERGY STAR PROGRAM CONSIDERATIONS.** This element considers the quality of the energy conservation investments which the proposer has included in the unit design. While the solicitation sets minimum standards for compliance, this element considers the overall quality of the housing unit systems and can provide additional consideration for systems which exceed the stated minimums.

(1) Residential Appliances. Consider energy star labeled refrigerator and dishwasher and other appliance upgrades with respect to energy conservation.
(2) Ductwork Systems. The design and general layout of the systems are evaluated in subfactor c above. This item represents efforts and procedures outlined in the proposal with respect to duct sealing and leakage reduction.
(3) Infiltration Reduction Systems. This item considers measures proposed which exceed the minimum requirements set forth in the solicitation.

**e. STRUCTURAL SYSTEM** This element considers the quality of the foundation and framing system design.

**FACTOR III: SITE DESIGN.** Site design includes overall planning, layout, design and development of the housing site(s), exclusive of utility systems. It embraces consideration of community appearance, compatibility of grounds and buildings, functionality, dignity, and livability. Generally excluded are considerations relative to the quality of materials, which are evaluated elsewhere. Elements making up this factor are itemized below:

Ranking of Sub-Factors:

Sub-factor **a** is most important with 55% of the total points available in this Factor.
Sub-factor **b** and **f** are each weighted approximately 20% of the value of sub-factor **a.**
Sub-factor **c, d,** and **e** are each weighted approximately 14% of the value of sub-factor **a.**

**a. SITE UTILIZATION AND DEVELOPMENT** The project density in housing units per hectare [acre] is pre-established by the project scope and the composition (number of units and number of bedrooms) in

relation to total area prescribed for development. Within this pre-established parameter, elements of site design to be evaluated include:
(1) Family Housing Area Development Concept
(2) Clustering. Grouping of structures to provide good accessibility to and from streets, parking areas, and usable attractive open areas.
(3) Building Solar Orientation and Variation of Structure Setback and Appearance. Achieving a desirable orientation of the majority of buildings with respect to solar gain, prevailing breezes and views, taking into account topography and climatic conditions in the area. Also consider unit setbacks, the relationship between units, and the relationship of units to the surrounding structural and existing landscape elements (e.g., trees, screens). A variation of the number and type of housing units shall be provided to produce a variety of exterior appearances.
(4) Buffering, Open Space, and Separation Between Structures. Consider separation of buildings from heavy traffic lanes and surrounding land uses not compatible with a resident development. Consider open space other than major recreation fields and play lots provided by the proposed layout. Evaluate adequacy of spacing between units to ensure sound, light, and individual and group privacy.

**b. VEHICULAR CIRCULATION** This sub-factor evaluates the capability of primary, secondary, and feeder streets to provide access to the units, community facilities, and service access to the units. The factor also evaluates vehicular and pedestrian safety. Considerations include the following:

(1) Access.
(a) Is there convenient and direct access to and from and between each structure and/or cluster, and to community facilities?
(b) Is the new street system a logical extension of the adjacent community?
(c) Does the primary, secondary, and feeder street system minimize traffic conflict points, minimize the number of turning movements at intersections, and maximize spacing of intersections?

(2) Service.
(a) Can service vehicles (maintenance, trash, moving vans and emergency) circulate efficiently in the development?
(b) Can delivery service trucks and moving vans gain access to and park in proximity to the housing units?
(c) Can fire trucks and ambulances gain immediate and direct access to each housing unit?

**c. PARKING** This sub-factor evaluates the proximity of parking to housing units and the layout of parking spaces. Considerations include the following:

(1) Proximity to Housing Units. Preferences are defined in descending order:
(a) Two spaces per housing unit adjacent to (within 7600 mm [25 ft]) the garage.
(b) One or two spaces adjacent to (within 7600 mm [25 ft]) the garage. Other spaces within 15200 mm [50 ft] of the housing units.
(c) Parking areas within 15200 mm [50 ft] of the housing units.
(d) Parking areas over 15200 mm [50 ft] from the housing units.

(2) Layout of Parking Areas. Evaluate in terms of:
(a) Internal circulation.
(b) Minimizing conflicts between cars entering and leaving the parking areas.
(c) Elimination of the necessity for backing into primary streets.
(d) Separation of parking area entrances and exits from street intersections.

**d. PEDESTRIAN CIRCULATION** This sub-factor evaluates the way in which the walkway system supports the movement of pedestrians from one location to another. If the overall street pattern does not make sidewalks functionally compatible with the sub-elements of a good pedestrian circulation system listed below, then the ratings assigned must reflect this functional inadequacy. Considerations include the following:

(1) Individual Units: Building Parking and Refuse Disposal
(a) Does the walkway system provide short direct access routes to the fronts of all housing units within a cluster and to adjacent clusters?
(b) Are parking areas connected to the structures they serve by walkways?
(c) Can all parts of the parking areas be reached without leaving the pavement?
(d) Does the walkway pattern minimize pedestrian traffic within the parking areas?
(e) Are walkways provided between housing units and trash containers and beyond that to street pickup points?

(2) To Play Lots, Neighborhood Park, Bus Stops, and Off Site Recreation Areas, Schools, Community Buildings, etc.
(a) Do walkways provide convenient routing to the above functions?
(b) Can play lots be reached without crossing primary or secondary streets?
(c) Does the walkway system provide a natural and convenient routing to a school within walking distance or to the nearest school bus stop?

**e. CHILDREN'S OUTDOOR PLAY AREAS** This sub-factor evaluates the quality and quantity of play lots and neighborhood parks. Considerations include the following:

(1) Neighborhood Parks
(a) Have age appropriate play events and equipment been provided for the 5-9 year age group?
(b) Have age appropriate play events and equipment been provided for the 9-15 year age group?

(2) Play Lots
(a) Have age appropriate play events and equipment been provided for the 6 week-5 year age group?
(b) Have age appropriate play events and equipment been provided for the 5-9 year age group?
(c) Have the requirements for age appropriate scale been applied to the children's outdoor play areas?
(d) Have the requirements for use zones under and around play equipment been applied to the children's outdoor play areas?
(e) Are the use zones shown on the site plan?
(f) Have the requirements for a playground safety surface been applied to the children's outdoor play areas?
(g) Have poisonuous plants and plants with thorns been avoided or removed from the children's outdoor play areas?

**f. LANDSCAPE PLANTING PLAN** This sub-factor evaluates the design, quality, quantity, and location of trees, shrubs, plantings, ground covers, and grass used to screen and enhance individual living units and recreation areas. Considerations include screening, decorative planting, and the following:

(1) Screening and Shading
(a) Have plant material been specified that is hardy to the area?
(b) Are plantings provided which screen between adjacent housing units, structures, and clusters to enhance privacy of the occupants? Consider number, size, type, and quality of trees and shrubs proposed.
(c) Are planting clusters provided to discreetly conceal trash container sites and clothes drying areas to the maximum extent possible without interfering with pedestrian and service vehicle access? Consider number, size, type, and quality. (Mandatory if screening fence is not provided.)
(d) Do trees provide summer solar shading on east, west, and south exposures of children's outdoor play areas?
(e) Are foundation plantings provided as appropriate to meet low maintenance requirements? Consider number, size, type, and quality.
(f) Are trees and shrubs used appropriately to define the open spaces?

(2) Street Trees.

(a) Are street trees provided in accordance with a street tree scheme for the hierarcy of streets in the area? Consider number, size, type, and quality.
(b) Have street trees been specified that are hardy to the area?

**FACTOR IV: SITE ENGINEERING.** Site engineering includes the technical performance of site design and exterior utility systems. The quality of the proposed construction materials is also evaluated in each element. Particular emphasis is placed on durability, corrosion resistance, pest and termite resistance, ease of maintenance, and life cycle cost of maintenance requirements. Consideration will be given to the suitability of the chosen material to the environment in which it is to be placed. Evaluation includes consideration of engineering aspects of operation and maintenance. Utility systems are to be evaluated beyond the 1500-m [5-ft] line from the housing units. Elements making up this factor are itemized below:

Ranking of Sub-Factors

Sub-factor **e** is the most important with 38% of the total points available for this factor.
Sub-factors **a, b, c, and d** are equal in weight with each weighted approximately 33% of the value of **e.**

**a. WATER SYSTEM** Evaluates system design, material quality, and maintainability.

**b. FUEL PIPING AND STORAGE** Evaluates piping sizes, material quality, layout, accessibility, and cutoff isolation.

**c. SANITARY SEWER** Evaluates system design, material quality, and maintainability.

**d. ELECTRICAL DISTRIBUTION** Evaluates system design, material quality, and maintainability.

**e. SITE INTEGRATION** This sub-factor evaluates grading, drainage, its integration with natural features, and the proposals integration with the surrounding area.

(1) Integration with Surrounding Area. This element evaluates the integration of physical flows and relationships with, and between, the site and surrounding area.
(2) Preservation of Natural Features . This element evaluates the preservation of trees, natural drainage swales, streams, and any other natural and historic features that lend interest and appeal to the community.
(3) Grading This element evaluates the effects of grading on the natural features of the site and the topographic features and character of the surrounding areas and region.
(a) Consider the aesthetic effects of grading.
(b) Does the grading plan enhance and blend with the natural conditions on the site? Does it blend the proposed development into the general topographic character of areas surrounding the site and the region in general?

(4) Drainage Design. This element evaluates the quality and effectiveness of the drainage system design in handling surface runoff. See SOW Paragraph 4.d. for additional requirements.

**FACTOR V – OFFEROR PAST PERFORMANCE.** This factor considers the offeror's performance on past similar projects.

**a. PROJECT EXAMPLES**

Examples (three are required) of design-build projects for which the offeror has been responsible will be evaluated. These examples should be as similar as possible to this solicitation in project type and scope. References (with contract names and telephone numbers) for all examples are required. Each example shall indicate the general character, scope, location, cost, and date of completion of the project. Contracts with similar Government and/or Non-Government experience within the last five years will also be evaluated. Indicate the contract number and the contracting agency (with contact names and telephone numbers), as well as the Construction Contractor Appraisal Support System (CCASS) performance evaluation. If the offeror represents the combining of two or more companies for the purpose of this RFP, each company is required to list their project examples including Government contract experiences.

**FACTOR VI – OFFEROR PROJECT TEAM AND PERFORMANCE PLANS.** This factor considers the offeror's proposed design, construction, and management team as well the proposed management plan and quality control plan proposed to accomplish this project. The following sub-items will be evaluated.

Ranking of Subfactors

Sub-factor c is most important with 35% of the total points available for this factor.
Sub-factor a is weighted at 87% of sub-factor c**.**
Sub-factor b is weighted at 62% of sub-factor c**.**

**a. PERSONNEL**

The resumes and levels of responsibility of the principal managers and technical personnel who will be directly responsible for the day-to-day design and construction activities will be evaluated. Information should include, as a minimum, the project manager; the project architect; landscape architect; the engineers responsible for civil, electrical, mechanical and structural design; the quality control manager; and the construction manager. Data should indicate whether each individual has had a significant part in any of the project examples cited. If reassignment of personnel is considered possible, the names and resumes of the alternative professionals for each assignment will be evaluated.

**b. MANAGEMENT PLAN**

The offeror's Management Plan, which should indicate how the offeror will control the job, both design and construction, will be evaluated. The term "management plan" is defined as a plan that includes the following subplans: Quality Control Plan; Design Schedule; Construction Schedule; and Contract Close Out Plan. As part of its Management Plan, the offeror has also submitted a Design Schedule and Construction Schedule for all phases of the project. The offeror has also submitted a rationale explaining how the schedules will be achieved. The schedule for construction should be task oriented, indicating dates by which milestones are to be achieved. The offeror may use a critical path or other method of his or her choice; however, the schedules must be graphically represented. A Close Out Plan is also required in a brief structured time scale schedule reflecting the planned activities during the final 90 days of the contract activity.

**c. QUALITY CONTROL PLAN**

The offeror's Quality Control Plan will be evaluated. The alliance of the project designer and builder on a project such as this naturally removes one commonly used method of quality control; that is, the usual reliance of the owner or the design consultant for monitoring construction quality. Although the Government will provide an on-site representative during construction, offerors are expected to develop a formal program of monitoring to ensure a high level of design and construction quality.

**SECTION 00600**

**Representations & Certifications**

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**Representations & Certifications**

Note: FAR and DFAR paragraphs are shown only for reference. All contractual information and requirements must be coordinated and produced through the PDT Contract Specialist. This TI is not meant to serve as contracting authority or direction.

| PARAGRAPH | DESCRIPTION |
|---|---|
| 52.203-11 | CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991) |
| 52.204-5 | WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999) |
| 52.204-3 | TAXPAYER IDENTIFICATION (OCT 1998) |
| 52.209-5 | CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (MAR 1996) |
| 52.215-6 | PLACE OF PERFORMANCE (OCT 1997) |
| 52.222-22 | PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999) |
| 52.223-1 | CLEAN AIR AND WATER CERTIFICATION (APR 1984) |
| 52.223-13 | CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 1996) |
| 52.226-2 | HISTORICALLY BLACK COLLEGE OR UNIVERSITY AND MINORITY INSTITUTION REPRESENTATION (MAY 1997) |
| 252.227-7028 | TECHNICAL DATA OR COMPUTER SOFTWARE PREVIOUSLY DELIVERED TO THE GOVERNMENT (JUN 1995) |
| 252.247-7022 | REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992) |

**SECTION 00700**

**Contract Clauses**

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**Contract Clauses**

Note: FAR and DFAR paragraphs are shown only for reference. All contractual information and requirements must be coordinated and produced through the PDT Contract Specialist. This TI is not meant to serve as contracting authority or direction.

| PARAGRAPH | DESCRIPTION |
|---|---|
| 52.232-33 | PAYMENT BY ELECTRONIC FUNDS TRANSFER—CENTRAL CONTRACTORb REGISTRATION (MAY 1999) |
| 52.202-1 | DEFINITIONS (OCT 1995) --ALTERNATE I (APR 1984) |
| 52.203-3 | GRATUITIES (APR 1984) |
| 52.203-4 | COVENANT AGAINST CONTINGENT FEES (APR 1984) |
| 52.203-7 | ANTI-KICKBACK PROCEDURES. (JUL 1995) |
| 52.203-8 | CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997) |
| 52.203-9 | PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997) |
| 52.203-12 | LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997) |
| 52.204-3 | PRINTING/COPYING DOUBLE-SIDED ON RECYCLED PAPER (JUN 1996) |
| 52.209-5 | PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT. (JUL 1995) |
| 52.215-2 | AUDIT AND RECORDS--NEGOTIATION (JUN 1999) |
| 52.215-11 | PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA--MODIFICATIONS (OCT 1997) |
| 52.215-12 | SUBCONTRACTOR COST OR PRICING DATA--MODIFICATIONS (OCT 1997) |
| 52.215-19 | NOTIFICATION OF OWNERSHIP CHANGES (OCT 1997) |
| 52.215-20 | REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA--MODIFICATIONS (OCT 1997) |
| 52.215-21 | REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA--MODIFICATIONS (OCT 1997) |
| 52.219-8 | UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 1999) |
| 52.219-9 | SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (OCT 1999)--ALTERNATE I (JAN 1999) |
| 52.222-3 | CONVICT LABOR (AUG 1996) |
| 52.222-4 | CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION. (JUL 1995) |
| 52.222-6 | DAVIS-BACON ACT (FEB 1995) |
| 52.222-7 | WITHHOLDING OF FUNDS (FEB 1988) |
| 52.222-8 | PAYROLLS AND BASIC RECORDS (FEB 1988) |
| 52.222-9 | APPRENTICES AND TRAINEES (FEB 1988) |
| 52.222-10 | COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988) |
| 52.222-11 | SUBCONTRACTS (LABOR STANDARDS (FEB 1988) |
| 52.222-12 | CONTRACT TERMINATION--DEBARMENT (FEB 1988) |
| 52.222-13 | COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988) |
| 52.222-14 | DISPUTES CONCERNING LABOR STANDARDS (FEB 1988) |
| 52.222-15 | CERTIFICATION OF ELIGIBILITY (FEB 1988) |
| 52.222-26 | EQUAL OPPORTUNITY (FEB 1999) |
| 52.222-27 | AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (FEB 1999) |
| 52.222-35 | AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE |

| PARAGRAPH | DESCRIPTION |
|---|---|
| | VIETNAM ERA (APR 1998) |
| 52.222-36 | AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998) |
| 52.222-37 | EMPLOYMENT REPORTS ON DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (JAN 1999) |
| 52.233-2 | CLEAN AIR AND WATER (APR 1984) |
| 52.233-3 | PROTEST AFTER AWARD (AUG. 1996) |
| 52.223-6 | DRUG-FREE WORKPLACE (JAN 1997) |
| 52.223-14 | TOXIC CHEMICAL RELEASE REPORTING (OCT 1996) |
| 52.225-5 | BUY AMERICAN ACT--CONSTRUCTION MATERIALS (JUNE 1997) |
| 52.225-11 | RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (AUG 1998) |
| 52.226-1 | UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES (SEP 1996) |
| 52.227-1 | AUTHORIZATION AND CONSENT (JUL 1995) |
| 52.227-2 | NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996) |
| 52.227-4 | PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984) |
| 52.228-1 | BID GUARANTEE (SEP 1996) |
| 52.228-5 | INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997) |
| 52.228-2 | ADDITIONAL BOND SECURITY (OCT 1997) |
| 52.228-11 | PLEDGES OF ASSETS (FEB 1992) |
| 52.228-15 | PERFORMANCE AND PAYMENT BONDS--CONSTRUCTION (SEP 1996) |
| 52.228-12 | PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS. (OCT 1995) |
| 52.228-13 | ALTERNATIVE PAYMENT PROTECTIONS (OCT 1997) |
| 52.228-14 | IRREVOCABLE LETTER OF CREDIT (DEC 1999) |
| 52.229-3 | FEDERAL, STATE, AND LOCAL TAXES (JAN 1991) |
| 52.232-5 | PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997) |
| 52.232-17 | INTEREST (JUNE 1996) |
| 52.232-23 | ASSIGNMENT OF CLAIMS (JAN 1986) - ALTERNATE I (APR 1984) |
| 52.232-27 | PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (JUN 1997) |
| 52.233-1 | DISPUTES. (DEC 1998) |
| 52.236-2 | DIFFERING SITE CONDITIONS (APR 1984) |
| 52.236-3 | SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984) |
| 52.236-5 | MATERIAL AND WORKMANSHIP (APR 1984) |
| 52.326-6 | SUPERINTENDENCE BY THE CONTRACTOR (APR 1984) |
| 52.236-7 | PERMITS AND RESPONSIBILITIES (NOV 1991) |
| 52.236-8 | OTHER CONTRACTS (APR 1984) |
| 52.236-9 | PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984) |
| 52.236-10 | OPERATIONS AND STORAGE AREAS (APR 1984) |
| 52.236-11 | USE AND POSSESSION PRIOR TO COMPLETION (APR 1984) |
| 52.236-12 | CLEANING UP (APR 1984) |
| 52.236-13 | ACCIDENT PREVENTION (NOV 1991) – ALTERNATE I (NOV 1991) |
| 52.236-15 | SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984) |
| 52.236-17 | LAYOUT OF WORK (APR 1984) |
| 52.236-21 | SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997) |
| 52.236-23 | RESPONSIBILITY OF THE ARCHITECT-ENGINEER CONTRACTOR (APR 1984) |
| 52.236-24 | WORK OVERSIGHT IN ARCHITECT-ENGINEER CONTRACTS (APR 1984) |
| 52.236-25 | REQUIREMENTS FOR REGISTRATION OF DESIGNERS (APR 1984) |
| 52.236-26 | PRECONSTRUCTION CONFERENCE (FEB 1995) |
| 52.242-13 | BANKRUPTCY. (JUL 1995) |
| 52.242-14 | SUSPENSION OF WORK (APR 1984) |
| 52.243-4 | CHANGES (AUG 1987) |
| 52.244-6 | SUBCONTRACTS FOR COMMERCIAL ITEMS AND COMMERCIAL COMPONENTS (OCT 1998) |
| 52.246-12 | INSPECTION OF CONSTRUCTION (AUG 1996) |

| PARAGRAPH | DESCRIPTION |
|---|---|
| 52.248-3 | VALUE ENGINEERING--CONSTRUCTION (MAR 1989) |
| 52.249-2 | TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996) – ALTERNATE I (SEP 1996) |
| 52.249-10 | DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984) |
| 52.253-1 | COMPUTER GENERATED FORMS (JAN 1991) |
| 252.203-7001 | PROHIBITION ON PERSONS CONVICTED OF FRAUD OR OTHER DEFENSE-CONTRACT- RELATED FELONIES (MAR 1999) |
| 252.203-7002 | DISPLAY OF DOD HOTLINE POSTER (DEC 1991) |
| 252.204-7003 | CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992) |
| 252.204-7004 | REQUIRED CENTRAL CONTRACTOR REGISTRATION.(MAR 1998) |
| 252.205-7000 | PROVISION OF INFORMATION TO COOPERATIVE AGREEMENT HOLDERS (DEC 1991) |
| 252.209-7000 | ACQUISITION FROM SUBCONTRACTORS SUBJECT TO ONSITE INSPECTION UNDER THE INTERMEDIATE-RANGE NUCLEAR FORCES (INF) TREATY (NOV 1995) |
| 252.209-7003 | COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS (MAR 1998) |
| 252.209-7004 | SUBCONTRACTING WITH FIRMS THAT ARE OWNED OR CONTROLLED BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998) |
| 252.215-7000 | PRICING ADJUSTMENTS (DEC 1991) |
| 252.219-7003 | SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DOD CONTRACTS) (APR. 1996) |
| 252.225-7002 | QUALIFYING COUNTRY SOURCES AS SUBCONTRACTORS (DEC 1991) |
| 252.225-7012 | PREFERENCE FOR CERTAIN DOMESTIC COMMODITIES. (MAY 1999) |
| 252.225-7031 | SECONDARY ARAB BOYCOTT OF ISRAEL (JUN 1992) |
| 252.225-7036 | BUY AMERICAN ACT NORTH AMERICAN FREE TRADE AGREEMENT IMPLEMENTATION ACT - BALANCE OF PAYMENTS PROGRAM (MAR 1998) |
| 252.227-7015 | TECHNICAL DATA--COMMERCIAL ITEMS. (NOV 1995) |
| 252.227-7022 | GOVERNMENT RIGHTS (UNLIMITED) (MAR 1979) |
| 252.227-7027 | DEFERRED ORDERING OF TECHNICAL DATA OR COMPUTER SOFTWARE (APR 1988) |
| 252.227-7033 | RIGHTS IN SHOP DRAWINGS (APR 1966) |
| 252.227-7037 | VALIDATION OF RESTRICTIVE MARKINGS ON TECHNICAL DATA. (SEP 199) |
| 252.236-7000 | MODIFICATION PROPOSALS - PRICE BREAKDOWN. (DEC 1991) |
| 252.236-7001 | CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS. (DEC 1991) |
| 252.236-7006 | COST LIMITATION (JAN 1997) |
| 252.243-7001 | PRICING OF CONTRACT MODIFICATIONS (DEC 1991) |
| 252.243-7002 | REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998) |
| 252.246-7000 | MATERIAL INSPECTION AND RECEIVING REPORT (DEC 1991) |
| 252.247-7023 | TRANSPORTATION OF SUPPLIES BY SEA (NOV 1995) |
| 252.247-7024 | NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (NOV 1995) |
| 252.248-7000 | PREPARATION OF VALUE ENGINEERING CHANGE PROPOSALS (MAY 1994) |

***CONTRACT CLAUSES FOR DESIGN-BUILD CONSTRUCTION CONTRACTS:***
***NOTES TO THE DESIGN DISTRICT***

*The applicable contract clauses (Section 00700) for a D-B RFP are generally the same as for a design/bid/build construction RFP solicitation. There are some special considerations to keep in mind for a D-B RFP. Clauses that allow the Government to tailor wording to fit the situation are discussed herein. We have also included some discussion on some standard clauses.*

***Suggested Clauses and Associated DFARS Clauses to be Included in a D/B Contract:***

*Requirements for Registration of Designers*
*Performance of Work by the Contractor*
*Limitations on Subcontracting*
*Commencement, Prosecution, and Completion of the Work*
*Governments Rights (Unlimited)*
*Drawings and Other Data to Become Property of the Government*
*Rights in Shop Drawings*
*Nondomestic Construction Materials*

***REQUIREMENTS FOR REGISTRATION OF DESIGNERS***

*It is extremely important to include this standard A-E contract clause in design-build construction contracts. Section 01012, "Design After Award", should specify requirements for the D-B contractor to designate "designers of record" for each design discipline. Section 01330, "Submittals", must specify the role of the DOR(s) to review and approve all submittals for extensions to design and other submittals, requiring coordination with the design. Section 00110, "Proposal Submission Requirements", requires offerors to identify and submit qualifications for the DOR(s). The below Contract Clause establishes minimum standards for registration.*

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**52.236-0025 REQUIREMENTS FOR REGISTRATION OF DESIGNERS (Apr 1984)**

The design of architectural, structural, mechanical, electrical, civil, or other engineering features of the work shall be accomplished or reviewed and approved by architects or engineers registered to practice in the particular professional field involved in a State or possession of the United States, in Puerto Rico, or in the District of Colombia.

(End of Clause)

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***PERFORMANCE OF WORK BY THE CONTRACTOR.***

*The following clause is mandatory for construction RFPs, not set-aside for small business or 8(a). The purpose of the clause is to prevent "brokering" of the work (that is where the winning contractor subs out the work to another firm or firms) and to require personal participation and management of the work by the prime contractor.*

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**52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)**

The Contractor shall perform on the site, and with its own organization, work equivalent to at least _____ (**) percent of the total amount of work to be performed under the contract, not including design

work. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of Clause)

***** NOTE:*** *The FAR allows us to edit the required percentage of required self-performed work. Analyze each project on its own merits. Success in design-build construction requires a firm with strong management skills in design and construction. It is recommended specifying a figure within the range of 12-15% of the construction amount, rather than the commonly used figure of "20%" for standard construction contracts. The design fee is normally excluded from the total amount of work. See FAR 36.501 for prescription for use. See also the discussion following this clause for suggested wording to include in Section 00110, "PROPOSAL SUBMISSION REQUIREMENTS", explaining to the offerors what is and what isn't defined as "self performed work." We have also included a standard form for offerors to calculate the amount of work proposed to be self performed and to submit for proposal evaluation.*

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***SECTION 0110, "PROPOSAL SUBMISSION REQUIREMENTS", SELF-PERFORMED WORK***

*Below is suggested wording, explaining the requirements of the Contract Clause "Self-Performance of Work." Include this information in Section 01010 "PROPOSAL SUBMISSION REQUIREMENTS. Note that contracts for 8(a) or SDB Set-Aside use a different clause and distinctly different method of calculation of self-performed work.*

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"XX. Self-Performed Work: Identify what construction parts of the project will be "self-performed" by in-house forces and the related cost for each part, as defined below. If sufficient information is available at the time your offer is prepared, state (within this Organization factor narrative) the percentage of work you will self-perform. If sufficient information is not available during preparation of this narrative, state that the information is in the Pro-Forma requirements (see the following paragraph). The prime contractor must perform [___] percent of the contract work with its own organization in accordance with Section 00800, "PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)."

XX.1 Computation Sheet. Provide and illustrate the calculation for "percent of self-performed work", in accordance with the definitions below. Use the form attached hereinafter.

XX.2 The following are definitions concerning self-performance of work by the Prime Contractor, in accordance with Section 00800, "PERFORMANCE OF WORK BY THE CONTRACTOR."

XX.2.1 "Self-performance of work" generally includes mobilization and utilization of owned or rented plant and equipment to be operated by the prime contractor's own employees; only those materials which will be both purchased and installed by the prime's own forces; labor associated with those aforementioned materials or equipment; only those supplies to directly support work performed by the contractor's own employees; and the contractor's own job overhead costs.

XX.2.2 The following is NOT self-performed work for purposes of the clause: Prime contractor markups for profit, general and administrative overhead, bonds, or other indirect costs on self-performed or subcontracted work; "Owner-operated equipment", rental of plant or equipment for operation by subcontractors; purchase of materials for installation by subcontractors.

XX.2.3 "On the site" includes the construction site(s) as well as off-site fabrication plant or other facilities necessary to manufacture assemblies or provide materials to be incorporated into the construction project.

XX.2.4 "Total amount of work to be performed under the contract" is comprised of all direct (variable, fixed, one-time and semi-variable) costs to the contractor, including jobsite overhead costs, to construct the project. It generally includes all self-performed work, as defined above, and cost of all supplies,

materials and subcontracts. It does not include design costs, home or branch office overhead costs or prime contractor markups for bond, profit, etc."

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*Shown below is a suggested standard form to include in section 00110, "Proposal Submission Requirements." Use this information to evaluate proposed self-performed work.*

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***FORMAT FOR CALCULATION OF SELF-PERFORMED WORK***
**DESIGN/BUILD CONTRACTS**
**For all Contracts, except 8(a)**

Use a format similar to the following to identify and calculate cost of the work to be self-performed. Refer to the definitions pertaining to "Self-performance of work", "On the site" and "Total amount of work to be performed under the contract". Include this information in the envelope for Pro Forma Requirements) if undetermined until the specified deadline for proposal submission. Otherwise include it in the Performance Capability information:

A. Clearly describe the work to be self-performed:

_____

_____

_____

B. Show Calculation of Self-Performed Work:

B.1 Total Bid Price: $_____

B.2 Subtract Design Cost: ($_____)

B.3 Subtract G&A, home office overhead, prime contractor's markups for profit, bond, state use tax, etc. ($_____)

B.4 Remainder is "Total amount of work to be performed under the Contract" = $_____

B.5 "Work to be self-performed": = $_____
(Includes mobilization and utilization of owned or rented plant and equipment to be operated by the prime contractor's own employees; only those materials which will be both purchased and installed by the prime's own forces; labor associated with those aforementioned materials or equipment; only those supplies to directly support work performed by the contractor's own employees; and the contractor's own job overhead costs.)

B.6 % Self-performed Work = Line B.5/ Line B.4 X 100% = _____%

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***LIMITATIONS ON SUBCONTRACTING.***

*Note that 8(a) or SDB set-aside contracts do not use the standard FAR Clause "PERFORMANCE OF WORK BY THE CONTRACTOR". Instead, use a Statutorily prescribed clause, entitled "LIMITATIONS ON SUBCONTRACTING." The purpose of the clause is to require personal supervision and control of the contract work by the SDB firm and to require substantial personal work performance (to avoid "brokering the work to non-minority firms). The definitions of self-performed work are substantially different than for non- 8(a) contracts. The clause is shown below, along with information and a form for use in Section 00110 "PROPOSAL SUBMISSION REQUIREMENTS" of the RFP for a competitive 8(a) or competitive SDB set-aside contract.*

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**52.219-14 LIMITATIONS ON SUBCONTRACTING (Jan 1991)**

(a) This clause does not apply to the unrestricted portion of a partial set-aside.

(b) By submission of an offer and execution of a contract, the Offeror/Contractor agrees that in performance of the contract in the case of a contract for:

(1) Services (except construction). At least 50 percent of the cost of contract performance incurred for personnel shall be expended for employees of the concern.

(2) Supplies (other than procurement from a regular dealer in such supplies). The concern shall perform work for at least 50 percent of the cost of manufacturing the supplies, not including the cost of materials.

(3) General construction **. The concern will perform at least 15 percent of the cost of the contract, not including the cost of materials, with its own employees.

(4) Construction by special trade contractors **. The concern will perform at least 25 percent of the cost of the contract, not including the cost of materials, with its own employees.

(End of Clause)

**Specify, in Section 0110, "PROPOSAL SUBMISSION REQUIREMENTS", whether the contract is for general construction or a single trade. This will clarify which sub-paragraph, (b)(3) or (b)(4), applies to the specific project).

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***SECTION 0110, "PROPOSAL SUBMISSION REQUIREMENTS", SELF-PERFORMED WORK FOR Competitive 8(a) or SDB Set-aside.***

*The following is suggested wording for inclusion in Section 00110 of the RFP:*

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"XX. Identify what parts of the project will be "self-performed" by in-house forces and the related cost for each part, as defined below. Provide and illustrate the calculation for "percent of self-performed work", in accordance with the definitions below.

XX.1 Definitions regarding self-performance of work by the Prime Contractor, in accordance with Contract Clause: "Limitations on Subcontracting" (FAR 52.219-14):

XX1.1 The work in this contract is "general construction" for purposes of Contract Clause "Limitations on Subcontracting."

XX.1.2 "Self-performed work" generally includes costs for: mobilization and utilization of owned or rented plant and equipment to be operated by the contractor's own employees and labor associated with the aforementioned equipment; contractor's own labor to fabricate or to install materials into the finished

construction; performance by the contractor's own employees of design work, land surveys and other engineering or technical specialist services required by the contract; supplies to directly support the aforementioned work to be accomplished by the contractor's own employees; and the contractor's own job overhead costs. Contractor markups for profit, general and administrative overhead, bonds, or other indirect costs on "self-performed" or subcontracted work are not "self-performed work" and are to be excluded from "total cost of the contract" for calculation purposes. Rental of plant or equipment for operation by subcontractors is not "self-performed work" but shall be included in the "total cost of the contract" for calculation purposes . Cost of materials to be incorporated into the work and supplies to support other than construction by the contractor's own employees are excluded from the above definition. Do not include these costs in the calculation.

XX.1.3 "Total cost of the contract" means the total direct (variable, fixed, one-time and semi-variable) costs to the contractor, including jobsite overhead costs but excluding the cost of any materials to be incorporated into the work, to construct the project. It generally includes the cost of all self-performed work, as defined above, and all supplies and subcontract costs. The cost of subcontractor furnished materials will be excluded only to the extent that they can be segregated and identified in the subcontractors' proposals.

XX.1.4 "Percent of self-performed work" is calculated by dividing the above defined cost of "self-performed work" by the "total cost of the contract" and multiplying the result by 100%."

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***COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK***

*Adapt this clause and Specification Section 01320, Project Schedule, as necessary to meet your requirements. You may state separate completion times for the design and the construction; however, this is discouraged. The recommendation is to state one completion time inclusive of both design and construction. If you allow the offerors to propose the contract duration period, add wording to cover acceptance of the selected offeror's proposed performance period – not to exceed a prescribed maximum period.*

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**52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (Apr 1984)**

(a) The Contractor shall be required to (1) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (2) prosecute the work diligently, and (3) design and construct the entire work.....**<--If the performance period is to be proposed by the offerors, use wording to this effect: "....ready for use not later than the proposed performance period after receipt of the contract notice to proceed. The maximum proposed performance period cannot exceed _____calendar days after receipt of the notice to proceed.">** The times stated for completion shall include final cleanup of the premises.

(b) Provisions stipulated for conducting test on heating and air conditioning systems and planting and maintenance of grass are excluded from the completion time stated above.

(End of Clause)

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***GOVERNMENT RIGHTS (UNLIMITED).***

*Use this DFARS clause in all design-build contracts, except those using the DFARS clause:* DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF THE GOVERNMENT**.** *The clause grants the Government non-exclusive rights to use the design on other projects.*

**52.227-7022 GOVERNMENT RIGHTS (UNLIMITED)(DFARS, Mar 1979)**

The Government shall have unlimited rights in all drawings, designs, specifications, notes and all other works developed in the performance of this contract, including the right to use same on any other Government design or construction without additional compensation to the Contractor. The Contractor hereby grants to the Government a paid-up license throughout the world to all such works to which he may assert or establish any claim under design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish the original or copies of all such works on the request of the Contracting Officer.

(End of Clause)

***DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF THE GOVERNMENT.***

*When the purpose of the Design-Build contract is to obtain a unique architectural design and construction of a building or monument, which for artistic, aesthetic or other special reasons the Government does not want duplicated, use the following DFARS clause to obtain exclusive control of the data pertaining to the design (ref: DFARS 227.7107(b)). In that case, do not use the DFARS clause: 52.227-7022 GOVERNMENT RIGHTS (UNLIMITED)*

**52.227-023 DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF THE GOVERNMENT (DFARS, Mar 1979)**

All designs, drawings, specifications, notes, and other works developed in the performance of this contract shall become the sole property of the Government and may be used on any other design without additional compensation to the Contractor. The Government shall be considered the "person for whom the work was prepared"? for the purpose of authorship in a copyrightable work under 17 U.S.C. 201(b). With respect thereto, the Contractor agrees not to assert or authorize others to assert any rights or to establish any claim under the design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish all retained works on the request of the Contracting Officer. Unless otherwise provided in the contract, the Contractor shall have the right to retain copies of all works beyond such period.

(End of Clause)

***NONDOMESTIC CONSTRUCTION MATERIALS***

*List all known allowable exceptions to the Buy America Act – Construction in the following clause.*

**NONDOMESTIC CONSTRUCTION MATERIALS (Oct 1966) DFARS 52.225-7003**

(a) The requirements of the clause of this contract entitled "Buy American Act" do not apply to the items set forth below:

**(LIST)**

(End of Clause)

**SECTION 00800**

**Special Contract Requirements**

**SECTION 00800**
**Special Contract Requirements**

Note: FAR and DFAR paragraphs are shown only for reference. All contractual information and requirements must be coordinated and produced through the PDT Contract Specialist. This TI is not meant to serve as contracting authority or direction.

| PARAGRAPH | DESCRIPTION |
|---|---|
| 52.211-12 | LIQUIDATED DAMAGES--CONSTRUCTION (APR 1984) |
| 52.211-10 | COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984) |
| 52.236-1 | PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) |
| 52.236-14 | AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984) |
| 52.236-4 | PHYSICAL DATA (APR 1984) |
| 252.201-7000 | CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991) |

***SPECIAL CONTRACT REQUIREMENTS.***
***NOTES TO THE DESIGN DISTRICT***

*Special Contract Requirements are contained in Section 0800 of the RFP. Because the D-B RFP includes design services and because the resulting contract includes the selected proposal, additional Special Contract Requirements (SCR's) have been developed to add to the usual set of SCR's used in design/bid/build competitively bid (IFB) construction solicitations.*

*The SCR's, listed below, have been specifically developed to define the non-traditional roles and responsibilities of the various parties in the D-B contract.*

***Suggested SCR's to be Included in Section 0800 of the D/B Contract:***

*Design Build Contract-Order of Precedence*
*Proposed Betterments (Optional)*
*Key Personnel, Subcontractors, and Outside Associates or Consultants)*
*Responsibility of the Contractor for Design*
*Warranty of Construction Work*
*Sequence of Design/Construction (Can Alternately be Included in Section 01012)*
*Sequence of Design/Construction (Fast Track)- (Can Alternately be Included in Section 01012)*
*Constructor's Role During Design (Can alternately be included in Section 011012)*
*Recommended Insurance Coverage (Optional)*
*Training (Can be included in a Technical Section)*
*Design Conferences (Can Alternately be Included in Section 01012)*
*Value Engineering After Award*
*Partnering (Highly Recommended)*

***DESIGN-BUILD CONTRACT-ORDER OF PRECEDENCE:***

*This SCR defines what constitutes the Contract, the order of precedence in the event of inconsistencies and further states that the design documents produced after award are "deliverables", not formally part of the contract, themselves.*

*It is essential that this SCR be included in the D-B contract. DO NOT USE the standard clause "ORDER OF PRECEDENCE-UNIFORM CONTRACT FORMAT" (FAR 52.215-8). This Clause is intended for use in service and supply contracts, using the Uniform Contract Format. The standard clause puts the order of precedence of the proposal above the Section "C", scope of work (SOW), in the event of inconsistencies or conflicts between the two. The SOW in the UCF format is usually more general in nature than the design and construction criteria in a D-B construction contract.*

*In design-build construction, we use the opposite philosophy. The RFP is the minimum standard, except where the Offeror's best value proposal exceeds the minimum RFP requirements. Then, the "betterment" in the proposal becomes the new minimum standard. In a case where the proposal deviates from the RFP minimum, the RFP governs.*

*This benefit to the Government comes at a price. The Government has an inherent legal duty to carefully read and evaluate the proposal for minimum RFP compliance prior to selection and award. Your RFP Section 00110, "PROPOSAL SUBMISSION REQUIREMENTS", should warn offerors not to deviate from the RFP requirements in their proposals. Your description of the basis of award in RFP Section 00120, "PROPOSAL EVALUATION CRITERIA" should state the requirement for successful proposal to be in conformance with the RFP requirements. Proposal deviations and deficiencies must be resolved prior to final proposal submission and award. If a proposal deviates from the RFP but is considered a good idea or approach, the Government must amend the solicitation to allow the feature. This keeps all offerors on a level playing field.*

*The Government cannot simply rely on the language of the D-B Order of Precedence SCR to avoid careful proposal evaluation. The intent of this clause is to establish an order of precedence in cases of not so obvious conflict, discovered after award.*

*The SCR defines the design products as "deliverables" under the contract. With the Government's concurrence, the Contractor may correct design errors and otherwise modify the design, as long as the design still complies with the RFP and accepted proposal. Otherwise, every time a line on a drawing or specification detail changes, a modification would be necessary. The Government can otherwise use "configuration control procedures" in Section 01012 (Design After Award) for requests, approval and tracking of non-contractual changes to the design documents.*

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**SCR___ DESIGN-BUILD CONTRACT-ORDER OF PRECEDENCE - AUG 1997**

(a) The contract includes the standard contract clauses and schedules current at the time of award. It also entails: (1) the solicitation in its entirety, including all drawings, cuts and illustrations, and any amendments during proposal evaluation and selection, and (2) the successful Offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any ways bears upon the terms of that agreement.

(b) In the event of conflict or inconsistency between any of the provisions of the various portions of this contract, precedence shall be given in the following order:

(1.) Betterments: Any portions of the Offeror's proposal which both meet and exceed the provisions of the solicitation

(2.) The provisions of the solicitation. (See also Contract Clause: SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION.)

(3.) All other provisions of the accepted proposal.

(4.) Any design products, including but not limited to plans, specifications, engineering studies and analyses, shop drawings, equipment installation drawings, etc. These are "deliverables" under the contract and are not part of the contract itself. Design products must conform to all provisions of the contract, in the order of precedence herein.

(End of Clause)

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***PROPOSED BETTERMENTS (OPTIONAL)***

*This is an optional clause for organizations that wish to use a process to formally list features of the proposal which are considered "betterments", as defined above. Some Districts feel that it is helpful in administering the contract to highlight all betterments in one list. Note that the proposal independently is part of the contract and that the list is merely administrative in nature. A Betterment, which may have been overlooked in the formal list, is nonetheless a contract requirement. A carefully prepared list helps bring betterments to the attention of contract administrators and design reviewers. However, it could also discourage a careful reading of the proposal during contract performance.*

**SCR___ PROPOSED BETTERMENTS – AUG 1997**

(a) The minimum requirements of the contract are identified in the Request for Proposal. All betterments offered in the proposal become a requirement of the awarded contract.

(b) A "Betterment" is defined as any component or system, which exceeds the minimum requirements, stated in the Request for Proposal. This includes all proposed betterments listed in accordance with the "Proposal Submission Requirements" of the Solicitation, and all Government identified betterments.

(c) "Government identified betterments" include the betterments identified on the "List of Accepted Project Betterments" prepared by the Proposal Evaluation Board and made part of the contract by alteration, and all other betterments identified in the accepted Proposal after award.

**(**End of Clause)

***KEY PERSONNEL, SUBCONTRACTORS AND OUTSIDE ASSOCIATES OR CONSULTANTS.***

*Contract Clause 52.244-4 "Subcontractors and Outside Associates and Consultants", has been modified by adding the term "Key Personnel".*

*The successful Offeror's proposal is part of the contract. This clause is intended to discourage "bid shopping" or "bait and switch" tactics by the Contractor after award of the contract. The Contractor must request permission to substitute those key personnel or key subcontractors it identified in its proposal. The accepted proposal establishes the new minimum standard (assuming that it was in full compliance with the RFP requirements). The Contractor will submit information in the same detail as the original proposal for the Government to evaluate. The Government should not approve any substitute that is not equal in all aspects to the originally proposed person or firm.*

*Since the contract was formulated by negotiation, prices were considered in the selection of the successful Offeror. It can be argued that the Government may demand a credit for a substitution, as consideration for the switch, where it appears that the substitution is the result of "bid shopping" or "bait and switch" tactics. There is no requirement for a price increase, because the Contractor established the minimum level of competency and the price the Government is expected to pay for that competency in its proposal. The proposal is the new required minimum standard, where identified performance surpassed the minimum RFP requirements. Anti-bid shopping clauses are common and enforceable in State, Local and commercial contracting.*

**SCR___ KEY PERSONNEL, SUBCONTRACTORS AND OUTSIDE ASSOCIATES OR CONSULTANTS - AUG 1997**

In connection with the services covered by this contract, any in-house personnel, subcontractors, and outside associates or consultants will be limited to the individuals or firms that were specifically identified and agreed to during negotiations. The contractor shall obtain the Contracting Officer's written consent before making any substitution for these designated in-house personnel, subcontractors, associates, or consultants.

(End of Clause)

***RESPONSIBILITY OF THE CONTRACTOR FOR DESIGN***

*This SCR is based on FAR Clause 52.236-0023, "Responsibility of the Architect-Engineer Contractor (Apr 1984)". The clause has been re-named for design-build. The words "non-construction services" were added to distinguish design responsibilities from warranty of the construction, which is covered under the "Warranty of Construction Work" SCR. The SCR also requires the D-B to correct the construction resulting from the faulty design.*

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**SCR___ RESPONSIBILITY OF THE CONTRACTOR FOR DESIGN - FEB 2000**

(a) The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications, and other non-construction services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiency in its designs, drawings, specifications, and other non-construction services and perform any necessary rework or modifications, including any damage to real or personal property, resulting from the design error or omission.

**(b) Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contact shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract. The Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of these services furnished under this contract.**

(c) The rights and remedies of the Government provided for under this contract are in addition to any other rights and remedies provided by law.

(d) If the Contractor is comprised of more than one legal entity, each entity shall be jointly and severally liable thereunder.

(End of Clause)

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***WARRANTY OF CONSTRUCTION WORK***

*USACE modified the standard "Warranty of Construction" Clause by deleting various references to "design furnished". That wording limited the warranty for design services to one year.*

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**SCR___ WARRANTY OF CONSTRUCTION WORK – AUG 1997**

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (1) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or
(2) Any defect of equipment, material, or workmanship.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice:

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of Clause)

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***SEQUENCE OF DESIGN/BUILD CONSTRUCTION***

*This SCR may also be referred to as "Sequence of Work". Two different Special Contract Requirements were developed to address this issue. Use the first SCR when all design or most of the design must be completed prior to allowing construction to begin. Use the second SCR when allowing "fast-track" design-build. Fast track is a term used to describe design and construction sequencing when the D-B incrementally completes and submits portions of the design, in "design packages", for Government review. Once the Government completes its review and all review comments are resolved, the ACO/COR will clear that design package for construction . Thus, in fast track design-build, design and construction can proceed concurrently.*

*The D-B RFP will include only one of the two SCR's. This information can also be alternately be addressed in Section 01012- "DESIGN AFTER AWARD".*

**SCR___ SEQUENCE OF DESIGN-CONSTRUCTION – AUG 1997**

(a) After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements as covered under Division 01 General Requirements, and obtain Government review of each submission. No construction may be started, <with the exception of....clearing, etc...> until the Government reviews the Final Design submission and determines it satisfactory for purposes of beginning construction. The ACO or COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

(b) If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

(c) No payment will be made for any in-place construction until all required submitttals have been made, reviewed and are satisfactory to the Government.

(End of Clause)

*Use the following Special Contract Requirement for fast track design-build contracts, in lieu of the above clause. This material can alternately be included in Section 01012-Design After Award.*

**SCR___ SEQUENCE OF DESIGN-CONSTRUCTION (FAST TRACK)**

(a) After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements as covered under Division 01 General Requirements, and obtain Government review of each submission. The contractor may begin construction on portions of the work for which the Government has reviewed the final design submission and has determined satisfactory for purposes of beginning construction. The ACO or COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

(b) If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

(c) No payment will be made for any in-place construction until all required submitttals have been made, reviewed and are satisfactory to the Government.

(End of Clause)

***CONSTRUCTOR'S ROLE DURING DESIGN***

*This SCR outlines the role of the Contractor's key construction management staff during the design process.*

**SCR___ CONSTRUCTOR'S ROLE DURING DESIGN – JUN 1998**

The Contractor's construction management key personnel shall be actively involved during the design process to effectively integrate the design and construction requirements of this contract. In addition to the typical required construction activities, the constructor's involvement includes, but is not limited to actions such as: integrating the design schedule into the Master Schedule to maximize the effectiveness of fast-tracking design and construction (within the limits allowed in the contract), ensuring constructability and economy of the design, integrating the shop drawing and installation drawing process into the design, executing the material and equipment acquisition programs to meet critical schedules, effectively interfacing the construction QC program with the design QC program, and maintaining and providing the design team with accurate, up-to-date redline and as-built documentation. The Contractor shall require and manage the active involvement of key trade subcontractors in the above activities.

(End of Clause)

***RECOMMENDED INSURANCE COVERAGE***

*This is an optional SCR to emphasize the D-B's liability for the adequacy of the design in the D-B contract.*

**SCR___ RECOMMENDED INSURANCE COVERAGE**

The Design-Build Contractor's attention is invited to the contract requirements concerning "RESPONSIBILITY OF THE CONTRACTOR FOR DESIGN" and "WARRANTY OF CONSTRUCTION WORK". These requirements vest in the Contractor complete responsibility for the professional quality, technical accuracy, and coordination of all design, drawings, specifications and other work or materials furnish by his in-house or consultant forces. The Design-Build Contractor must correct and revise any errors or deficiencies in his work, notwithstanding any review, approval, acceptance or payment by the Government. The Contractor must correct and change any work resulting from his defective design at no additional cost to the Government. The requirements further stipulate that the Design-Build Contractor shall be liable to the Government for the damages to the Government caused by negligent performance. Though not a mandatory requirement, this is to recommend that the Design-Build Contractor investigate and obtain appropriate insurance coverage for such liability protection.

(End of Clause)

***TRAINING***

*This is suggested wording for a training requirement. This requirement can alternately be included elsewhere in the contract, for example, in Section 01012, "DESIGN AFTER AWARD". It is highly recommended that training be video taped for use by future maintenance personnel.*

**SCR___ TRAINING – FEB 2000**

The Contractor shall provide operational and maintenance training for all systems furnished under this contract for the operating and maintenance personnel. The system manufacturer shall conduct the training, where feasible. All operation and maintenance manuals shall be submitted and approved prior

to conducting the training and shall be used during training. The Contractor shall video tape the training session on VHS tapes and provide the tapes to the Government.

(End of Clause)

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***DESIGN CONFERENCES.***

*This information can be included in the RFP as an SCR or it can be addressed in Section 01012, "Design After Award."*

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**SCR____ DESIGN CONFERENCES – JUN 2000**

(a) Pre-Work: As part of the Pre-Work Conference conducted after contract award, key representatives of the Government and the Contractor will review the proposal and the design review procedures specified herein, discuss the preliminary design schedule and provisions for phase completion of the D-B documents with construction activities (fast tracking), as appropriate, meet with key Corps of Engineers Design Review personnel and Using Agency points of contact and any other appropriate pre-design discussion items.

(b) Initial Design Coordination Meeting: After award of the contract, the Contractor shall visit the site and conduct extensive interviews, and problem solving discussions with the individual users, base personnel, Corps of Engineers personnel to acquire all necessary site information, review user options, and discuss user needs. The Contractor shall document all discussions. The design shall be finalized as direct result of these meetings.

(c) Design Review Conferences: Review conferences will be held at <INSERT LOCATION> for each design submittal. The Contractor will bring the personnel that developed the design submittal to the review conference. The conferences will take place the week after the review is complete.

(End of Clause)

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***VALUE ENGINEERING AFTER AWARD***

*This SCR is intended to clarify what the Government will and won't consider after award under Contract Clause, 52.248-3, "VALUE ENGINEERING – CONSTRUCTION."*

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**SCR____ VALUE ENGINEERING AFTER AWARD – JUNE 1999**

(a) In reference to Contract Clause 52.248-3, "Value Engineering – Construction", the Government may refuse to entertain a "Value Engineering Change Proposal" (VECP) for those "performance oriented" aspects of the Solicitation documents which were addressed in the Contractor's accepted contract proposal and which were evaluated in competition with other offerors for award of this contract.

(b) The Government may consider a VECP for those "prescriptive" aspects of the Solicitation documents, not addressed in the Contractor's accepted contract proposal or addressed but evaluated only for minimum conformance with the Solicitation requirements.

(c) For purposes of this clause, the term "performance oriented" refers to those aspects of the design criteria or other contract requirements which allow the Offeror or Contractor certain latitude, choice of and flexibility to propose in its accepted contract offer a choice of design, technical approach, design solution,

construction approach or other approach to fulfill the contract requirements. Such requirements generally tend to be expressed in terms of functions to be performed, performance required or essential physical characteristics, without dictating a specific process or specific design solution for achieving the desired result.

(d) In contrast, for purposes of this clause, the term "prescriptive" refers to those aspects of the design criteria or other Solicitation requirements wherein the Government expressed the design solution or other requirements in terms of specific materials, approaches, systems and/or processes to be used. Prescriptive aspects typically allow the Offerors little or no freedom in the choice of design approach, materials, fabrication techniques, methods of installation or other approach to fulfill the contract requirements.

(End of Clause)

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***"PARTNERING" (Optional SCR).***

*Encouraging the Contractor to participate in a partnering process is highly recommended in design-build construction contracts. Why? Because D-B involves non-traditional roles and responsibilities.*

*Design or construction issues affect each other in time and cost and the integrated design and construction schedule is very sensitive to delays – especially when fast tracking is involved. The Government must be more responsive to the information, review, and decision needs of the D-B Contractor.*

*The D-B Contractor should be responsive to the user's functional needs, often expressed in general terms of "design intent" in the RFP. The D-B Contractor may be flexible with design details, as long as they can be accommodated within the cost and time budgets. Therefore, it is essential that channels of communications and mutual understanding of the other party's needs be facilitated. Partnering can be very effective toward achieving those goals.*

*Depending upon the size of the job, partnering can be formal or informal. Larger projects can allow for the costs associated with a formal process. Note that there are various formats in use for Partnering, with various cost sharing schemes):*

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**SCR___. PARTNERING – FEB 2000**

In order to most effectively accomplish this contract, the Government proposes to form a partnership with the Contractor to develop a cohesive building team. It is anticipated that this partnership would involve the **<NAME THE USING ORGANIZATIONS AND OTHER CRITICAL PARTIES HERE>,** the Contractor, primary subcontractors and designers and the Corps of Engineers. This partnership would strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership would be bilateral in membership and participation will be totally voluntary. Any cost associated with effectuating this partnership, excluding travel and lodging cost of Government personnel, will be borne by **<<SELECT AN OPTION TO SPECIFY: the Contractor/ each party/ the Government >>**. The partnering meetings shall be held in .....

(End of Clause)

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# STATEMENT OF WORK

**STATEMENT OF WORK**

**TABLE OF CONTENTS**



**LISTING OF TABLES**

**LISTING OF TABLES (CONTINUED)**



**NOTES TO USACE ACTIVITY PREPARING SOLICITATION**

1. Text in brackets [brackets] are instructions and/or require editing.
2. Reserved for future use.
3. Page numbers in table of contents above should be revised when developing a project specific RFP.
4. Hard page breaks should be inserted in the generic RFP to avoid breaking tables when possible.
5. Metric dimensions are shown first with inch-pound measurements in [brackets] after to comply with the Metric Conversion Act of 1975 (Public Law 94-168) as amended by the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100-418) and Executive Order 12770 dated July 25, 1991. Projects constructed using this RFP are to be in metric (SI) measurements. Review the metric dimensions to facilitate the use of metric standard products when the RFP is edited.
6. This Statement of Work (SOW) supersedes SOW dated 1 November 1996, 29 May 1997, and 10 Sep 1999.
7. This SOW includes EIRS Bulletins 97-02, Encl 3, Telephone Cable in Family Housing; 97-04, Encl 3, Family Housing Energy Conservation Improvements; and 99-01, Encl 1, Carbon Monoxide Alarms in New Family Housing.

**STATEMENT OF WORK**

## 1. DESIGN OBJECTIVES.

The design and construction shall comply with the specifications and requirements contained in this Request for Proposals (RFP). The design and technical criteria contained and cited in this RFP establish minimum standards for design and construction quality. All housing units constructed in accordance with these standards are "Energy Star Homes".

1.a. Work Scope. The objective of this solicitation is to obtain housing complete and adequate for assignment as quarters for military personnel and their families. This contract shall consist of the design and construction of a total of [insert.] housing units on Government-owned land at [installation and location], which comply with this RFP. Work shall consist of the following:

1.a.(1) Housing Units. Housing units with patio or balcony, garage, exterior storage, [individual central heating systems, energy conservation systems and central air conditioning], and including the following Contractor-furnished/Contractor-installed (CF/CI) equipment and appliances: range, refrigerator, garbage disposal, dishwasher, water heater, [carbon monoxide alarms], and smoke detectors. [Include clothes washer and dryer for overseas projects.] Housing units shall be a mix of two-, three-, four-, and/or five-bedroom housing units as shown in Table 1-1:

**TABLE 1-1 - HOUSING UNITS**

| Pay Grade | Number of Bedrooms | Number of Units |
|---|---|---|
| O-7 and above (GO) | 4 | Note [1] |
| O-6 (SO) | 4 | Note [1] |
| O-4 and O-5 (FGO) | 4 | Note [1] |
| | 3 | Note [1] |
| O-1 through O-3 (CGO) | 5 | Note [1] |
| | 4 | Note [1] |
| | 3 | Note [1] |
| | 2 | Note [1] |
| E-7 through E-9 (SNCO) | 5 | Note [1] |
| | 4 | Note [1] |
| | 3 | Note [1] |
| | 2 | Note [1] |
| E-1 through E-6 (JNCO) | 5 | Note [1] |
| | 4 | Note [1] |
| | 3 | Note [1] |
| | 2 | Note [1] |

Note [1]: [Edit for specific project requirements.]

1.a.(2) Accessible units. No less than five (5) percent of each unit type at each site shall be single-story ground floor housing units. New and replacement general officer units shall be built accessible. These housing units shall be designed and built in such a way that they may be easily and readily modified to accommodate physically challenged occupants at time of occupancy. See paragraph 5.a.(2)(a). Design of accessible housing units shall conform to the Uniform Federal Accessibility Standards (UFAS) and American Disabilities Act Accessibility Guidelines (ADAAG). Accessible housing units shall be well dispersed throughout the development and shall not be grouped or clustered so as to create segregated pockets within the housing community. The requirement to have an additional two (2) percent of housing units equipped with warning devices for the hearing and visually impaired will be met at the time the unit is assigned to an occupant needing this equipment.

1.a.(3) Site area and density.

1.a.(3).(a) Site area. The site/s is/are described on the RFP drawings included as part of this solicitation and includes approximately _____ hectares [_____ acres]. Site work includes all design and construction of the site design to include grading, storm drainage, erosion control, pedestrian and vehicular circulation, utility systems, outdoor lighting, play lots, neighborhood parks, and physical security.

1.a.(3).(b) Site density. This project consists of [Insert] housing units on [Insert] of land area. The project site is approved for [LOW DENSITY, MEDIUM DENSITY, HIGH DENSITY] siting]. [Edit as appropriate.] Site development shall comply with the minimum requirements for [LOW DENSITY, MEDIUM DENSITY, HIGH DENSITY] siting. [Insert site area, edit for appropriate site density and add any special site constraints.]

1.a.(4) Special utilities and supplementary construction. [Insert special utility items, supplementary construction, on- or off-site]

1.a.(5) Demolition considerations and requirements. [Insert special items with respect to demolition requirements. Asbestos and lead paint surveys should be included as an Attachment to this Statement of Work].

1.b. Energy Star Homes Program Requirements: The Contractor, at the direction of the USACE Contracting Officer's Representative, shall be required to submit to the EPA the necessary information and certifications to register the units constructed in this project as Energy Star Homes. The contractor constructing housing units in accordance with this Statement of Work is not required to be a registered Energy Star Contractor. The required information can be submitted to EPA in several methods:

1.b.(1) Through the Internet by clicking on the *certificate automation system* icon at the World Wide Website http://yosemite.epa.gov/appd/eshomes/eshomes.nsf and following the instructions

1.b.(2) By emailing to certificates@epa.gov

1.b.(3) By mailing to the EPA Customer Service Manager (address & tel. no. below)

The following information needs to be submitted for each home [note: homes can be submitted *individually* (each home individually tested/rated) or in a "*batch*" (for batches of homes, particular unit types). The following data should be provided for each home (note: this can be in the form of a spreadsheet, database, word processing file or email; if the format changes in the future EPA will inform the contractor of the changes):

1.b.(3).(a) Contractor company name (ex. Jones Construction Co.)
1.b.(3).(b) Contractor telephone number (ex. 703-123-4567)
1.b.(3).(c) Name of company/organization performing testing/rating (ex. Jones Construction Co.)
1.b.(3).(d) Telephone number of company/organization performing testing/rating (ex. 703-123-4567)
1.b.(3).(e) Street address of home being submitted, including city, state & zip code (ex. 123 Smith St., City, State 12345)
1.b.(3).(f) Type of verification:

"**FEP**" --- if this particular home underwent infiltration testing (and possibly duct leakage testing). Please list the tested infiltration value in ACH/nat (natural air changes per hour) and if tested, the duct leakage to nonconditioned spaces in cfm and % of air handler flow at a pressure of 25 pascals.

"**SEP**" --- if this particular home did *not* undergo infiltration and/or duct leakage testing, but was a member of a batch out of which at least 15% DID; if so, then the address of a home that was a tested member of this batch should also be identified as the tested member of the batch.

1.b.(3).(g) The following statement: "This home qualifies as an EPA Energy Star Home by conforming to the residential energy efficiency specifications and quality control confirmation of U.S. Army Corps of Engineers TI 801-02, Family Housing, dd-MM-yy [Design District fill in date of edition], which has been determined by the EPA and USACE to be an ***Equivalent Program*** to the EPA Energy Star Homes Program." In addition, the "checklist" of home specifications that the USACE Contracting Officer's Representative uses to ascertain if the TI 801-02 specifications and testing results were met should be submitted. The statement and checklist should have the USACE Contracting Officer's Representative's signature affixed.
1.b.(3).(h) The year the house was built (ex. 2000)

1.b.(3).(i) The year the house was submitted for Energy Star certification (ex. 2000)
1.b.(3).(j) The name and title/rank, mailing address, email address, telephone number and fax number of the USACE Contracting Officer's Representative overseeing the contractor's adherence to construction specifications, quality control of construction and testing/rating activities.

1.b.(4) The Contractor will make arrangements with the EPA for receipt of the "Energy Star Homes" certificates and unit plaques and shall provide the certificates to the USACE Contracting Officer's Representative and include in the project the installation of the plaques on each of the housing units. Coordination point with the EPA regarding Energy Star certification and plaques shall be as follows:

United States Environmental Protection Agency
Climate Protection Division
US EPA 6202J
Washington DC 20460
ENERGY STAR Homes Customer Service Manager
ATTN: Mr. Brian Ng, Ng.Brian@epa.gov, 202-564-9162, fax: 202-565-2079
http://www.energystar.gov/homes

Technical questions on the Energy Star Homes Program in general can be addressed to:

ENERGY STAR Homes Technical Coordinator
ATTN: Mr Glenn T. Chinery, Chinery.Glenn@epa.gov, 202-564-9784, fax: 202-565-2079

1.c. Design Freedom. Requirements stated in this RFP are minimums. Innovative, creative, or cost-saving proposals which meet or exceed these requirements are encouraged and will receive quality points accordingly. Existing housing plans or modifications thereof that meet the design and construction criteria specified herein, which an offeror has previously constructed and priced, may be submitted. They may include designs incorporating factory fabricated components or modules. Deviations from space and adjacency requirements are discouraged unless the changes result in improvement to the facilities.

1.d. Housing Units. . Site-built, factory-built, and manufactured-housing units are acceptable options for this project. [Edit in accordance with project requirements and/or special instructions contained in Design Directives.]

1.e. Definition of Housing Unit Types. Terms for housing unit types used in these criteria are defined as follows:

1.e.(1) Site-built housing. A residential building or housing unit wholly or substantially constructed at the site.

1.e.(2) Factory-built housing. Construction consisting of components, sub-assemblies such as modules, panelized walls, roof trusses, floor joists, and other factory-assembled components, which are transported to the construction site and further assembled into completed housing units. All interior and exterior walls, regardless of whether they are structural (load bearing) or not, are plant fabricated (panelized). Panels must be fabricated to the extent that the structure of the panel or truss is factory-assembled. Finishes such as interior wall board may be site applied.

1.e.(3) Manufactured housing. As defined in Public Law 93-383, Title 24, Chapter XX amended (1977, 1978, 1979, and 1980), a manufactured home is "a structure, transportable in one (1) or more sections which in the traveling mode is eight body feet or more in width, or forty body feet or more in length, or, when erected on site, is built on a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air conditioning and electrical systems contained therein."

1.e.(4) Apartment buildings. Housing units on a single floor served by a central corridor. Apartment buildings of this type may be one (1) to three (3) stories.

1.e.(5) Garden apartments. Housing units on a single floor with direct entry from a stairway landing. Housing units shall be full depth from front to back without intervening public corridors. Buildings shall be no more than three stories high, and designed so that no more than one (1) stairway per module is required. Normally, no more than two housing units will be served by each stair landing.

1.e.(6) Duplex. One or two-story housing units joined together by a common party wall and each housing unit entered directly from the exterior.

1.e.(7) Townhouses. One, two, or three-story housing units having one (end units) or more party walls. Configurations, such as triplexes, quadruplexes and up to six housing units, are considered to be townhouses.

1.e.(8) Detached house. A single-family housing unit which is not attached to another housing unit.

1.f. Design Quality. The objectives are to obtain housing structures and complimentary site development within funds available and to optimize livability. Design quality is achieved through the optimization of interior planning, integration of housing structures to the site, and balancing architectural attractiveness, variety, function, and design for low-cost maintenance and operation. Offerors should consider sustainable design applications in developing proposals, see para 13.

1.g. Installation Real Property Master Plan. The installation real property master plan provides comprehensive documentation of the existing conditions of natural, man-made, and human resources. It also guides the future land-use development. The real property master plan should be consulted as it is the mechanism for ensuring that individual projects are sited to meet overall installation goals and objectives for land use development

1.h. Installation Design Guide. [Insert "...(Deleted)" and delete remainder of text that is not applicable.] Design of this project shall incorporate the design guidance and criteria contained in the Installation Design Guide, excerpts of which are contained in Attachment 9.

1.i. Energy and Resources Conserving Features. Public Law 102-486, Executive Order 12902, and Federal Regulations 10 CFR 435, require Federal buildings to be designed and constructed to reduce energy consumption in a life-cycle, cost-effective manner using renewable energy sources when economical. Products designed to conserve energy and resources by controlling the amounts of consumed energy or by operating at increased efficiencies should be considered. Minimum requirements for this project are [List features required such as high-efficiency central air conditioning and/or heating units, setback thermostats, and water flow-limiting plumbing fixtures]. Offerors are required to provide Energy and Resource conserving improvements that at least insure compliance with the Energy Star Homes Program parameters.

1.j. Prototype Housing Units. The purpose of the prototype housing unit is to verify the details of the approved design and material selections, and to establish the quality level against which the remaining work will be judged. At the plant, or at the site, construction connection details shall be exposed for study by authorized Government inspectors for a period of time agreed to by the Contractor and the Contracting Officer. The housing unit or units at the plant and/or the prototype at the site are subject to Contracting Officer's approval. At the site, the complete prototype shall be constructed for each housing unit type. Each stage of work shall be completed and accepted on the prototype prior to starting work on the same stage for similar housing units in the project.

1.j.(1) "Site-Built." A prototype housing unit shall be required for each housing unit type.

1.j.(1).(a) [The following paragraph may be added at the discretion of the USACE Design Activity. Inclusion of this requirement will allow construction Quality Assurance staff to have a model by which to judge construction of the units in the project.] Where multiple prototype units are being constructed, one or two prototype units shall be left in the “rough in” stage (no interior finishes) so that the utility systems and framing construction is exposed. Exteriors of these prototypes shall be completely finished. When the last new units are constructed, these “rough in” stage prototype units shall be completed and turned over to the Government with the last turn-over group.

1.j.(2) "Manufactured" or "Factory-Built." A prototype housing unit shall be required for each housing unit type of each run fabricated at the plant for manufactured or factory-built homes.

1.j.(2).(a) Manufactured. If the housing units are classified as manufactured housing, all interior and exterior systems which form integral parts of the transportable module shall be constructed and assembled for inspection by the Government. This shall include, as a minimum, wall and ceiling construction, interior finishes, utility piping, wiring, and ductwork fastening and assembling of adjacent modules, connection details to sinks, installed kitchen cabinets and countertops. Portions of the work shall be left unfinished or exposed to demonstrate interior construction details.

1.j.(2).(b) Factory-Built. If the housing units are classified as factory-built housing, all wall panels which are fabricated in the plant for shipment to the site shall have prototype units constructed and assembled for in-plant inspection by the Government. This shall include, as a minimum, wall framing, roof and ceiling framing, connection details, utility piping, wiring and ductwork, interior and exterior wall finishes which form part of the factory-built wall. In addition, the Contractor shall construct as part of the factory-built prototype, installed samples of wall insulation, finished siding (if not part of wall assembly), sample installed bathtub and sink and installed kitchen sink and cabinets to demonstrate proper installation and wall connections. Portions of the work shall be left unfinished or exposed to demonstrate interior construction details.

1.j.(2).(c) One Floor Prototype. If only one floor of the prototype is manufactured or factory-built, factory assembly of the manufactured or factory-built portion of the prototype is required. In all cases, the factory prototype shall consist of one of each building type. The factory prototype shall be assembled to verify assembly connections, details, construction, and transportation of the finished housing unit.

1.j.(2).(d) Structural Integrity. Manufactured and factory-built homes shall be of individual housing units attached to one another in a manner which shall provide a finished structural assembly having an appearance and structural integrity comparable to a site-built single or multi-family residence built to applicable codes.

1.j.(2).(e) Construction Tolerances. Assembled housing units shall be true and plumb and all within specified construction tolerances for all alignments represented on the drawings. Adjacent walls shall be attached at roof and floor levels in such a manner as to preclude placing any wood member in cross-grain bending or cross-grain tension, and to avoid putting nails in withdrawal.

1.k. Force Protection & Anti-Terrorism Considerations. Project design and construction shall comply with the applicable DoD standards. Specific requirements are outlined below: [Design District shall investigate applicable requirements and insert into the statement of work at this point. Beginning in FY-03 all new construction and whole neighborhood replacement projects will require compliance with the DoD standards.]

**2. CRITERIA REFERENCES.**

Criteria to be used for design and construction shall be taken from the most current references at the date of issue of the RFP. Administrative, contractual, and procedural features of the contract shall be as described in other sections of the RFP. Referenced codes and standards herein and those listed below are minimum acceptable criteria.

2.a. Local and State Codes or Standards. The following specifications, standards, bulletins, and handbooks form a part of this document to the extent specified herein. Unless otherwise indicated, copies are available from [Insert]

2.a.(1) Local. [List applicable model codes or standards.]

2.a.(2) State. [ List applicable state codes or standards.]

2.b. Federal Laws. The Federal laws and regulations listed in Table 2-1 form a part of this document. They are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20401-9325 (202) 512 - 1800

**TABLE 2-1 – FEDERAL LAWS & REGULATIONS**

| CFR/USC No. | Description |
|---|---|
| P.L. 102-486 | Energy Policy Act of 1992 |
| 10 CFR 430 | National Appliance Energy Conservation Act (NAECA) |
| 10 CFR 435 | Voluntary Performance Standards for New Commercial and Multi-Family High Rise Residential Buildings; Mandatory for Federal Buildings. |
| 10 CFR 436 | Methodology and Procedures for Life Cycle Cost Analyses |
| 16 CFR 1630 | Standard for Surface Flammability of Carpet and Rugs |
| 40 CFR 247.12 | Comprehensive Procurement Guideline for Products Containing Recovered Materials, Construction Products |
| 40 CFR 280 | Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks |
| 49 CFR 192 | Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards |
| 49 CFR 195 | Transportation of Hazardous Liquids by Pipeline |
| 10 USC 2826 | Public Law 97-214, Military Construction and Military Family Housing |
| 24 USC 5301 | Public Law 93-383, Community Development |
| 42 USC 4321-4361 | National Environmental Policy Act (NEPA) |
| 42 USC 4901-4918 & 49 USC 1431 | Noise Control Act of 1972 |

| TABLE 2-1 – FEDERAL LAWS & REGULATIONS | |
|---|---|
| CFR/USC No. | Description |
| 42 USC 5401-5426 | Federal Manufactured Housing Construction and Safety Standards Act of 1974 |
| Army Regulation 200-1 | Environmental Protection and Enhancement, May 1990 |
| E.O. 12902 | Energy Efficiency and Water Conservation in Federal Facilities |

2.c. Federal Specifications and Standards. The specifications listed form a part of this document to the extent specified herein. Federal Standard 795, Uniform Federal Accessibility Standards, and federal specifications are available from the Commanding Officer, Naval Publications and Forms Center, ATTENTION: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

2.d. Other Government Documents and Publications. The following Government documents and publications form a part of this document to the extent specified herein:

2.d.(1) Americans With Disabilities Act Accessibility Guidelines, are available from U.S. Architectural and Transportation Barriers Compliance Board, 1331 F Street, N.W., Washington, D.C. 20004-1111

2.d.(2) Federal Emergency Management Agency, Mitigation Directorate; 500 C Street, SW; Washington DC 20472: National Performance Criteria for Tornado Shelters and FEMA 320, Taking Shelter from the Storm: Building a Safe Room Inside Your Home. http://www.fema.gov/

2.d.(3) NBS Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program. Available from the National Institute of Science and Technology, formerly National Bureau of Standards (NBS).

2.d.(4) Standard for the Surface Flammability of Carpets and Rugs; and (Unnumbered) Handbook for Public Playground Safety, CFR 16-1630. Available from the Consumer Product Safety Commission, Directorate for Compliance and Administrative Litigation, Department of Regulatory Development, Washington, DC 20207, (301) 492-0626 or 492-0400.

2.d.(5) United States Environmental Protection Agency criteria are available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4650: EPA/600/8-88/087, Radon-Resistant Residential New Construction; EPA/625/5-88/024, Application of Radon Reduction Methods; and EPA/625/5-87/019, Radon Reduction Techniques for Detached Houses.

2.e. Non-Government Publications. The following publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are Department of Defense (DoD) adopted are those listed in the Department of Defense Index of Specifications and Standards (DODISS).

2.e.(1) Air Conditioning Contractors of America, Inc. (ACCA). 1712 New Hampshire Ave. NW. Washington DC 20009; (202) 483-9370; FAX (202) 588-1217; http://www.acca.org/.

2.e.(2) Air-Conditioning and Refrigeration Institute (ARI). Information listed below is available from ARI, 4301 Fairfax Dr., Suite 425, ATTN: Pubs Dept.,Arlington, VA 22203, Ph: 703-524-8800, Fax: 703-528-3816, Internet E-Mail: ari@dgsys.com, Directory of Certified Unitary Air Conditioners, Unitary Heat Pumps and Sound Rated Outdoor Unitary Equipment; ARI 210/240, Unitary Air Conditioning and Air-Source Heat Pump Equipment: http://www.ari.org/

2.e.(3) AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA), AMCA 210, Laboratory Methods of Testing Fans For Rating, is available from AMCA, 30 West University Drive, Arlington Heights, IL 60004, (312) 394-0150: http://www.amca.org/

2.e.(4) American Architectural Manufacturers Association (AAMA). AAMA specifications shown in Table 2-2 are available from AAMA, 1540 East Dundee Rd., Suite 310, Palatine, IL 60067-8321,Ph: 708-202-1350,Fax: 708-202-1480 2700 River Road, Suite 118, Des Plaines, IL 60018, (312) 699-7310.

**TABLE 2-2 - AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION SPECIFICATIONS**

| No. | Description |
|---|---|
| AAMA 101 | Voluntary Specification for Aluminum Prime Windows and Sliding Glass Doors |
| AAMA 101V | Voluntary Specification for Poly (Vinyl Chloride) (PVC) Prime Windows and Sliding Glass Doors |
| AAMA 1002.10 | Voluntary Specifications for Aluminum Insulating Storm Products for Windows and Sliding Glass Doors |
| AAMA 1402 | Standard Specifications for Aluminum Siding, Soffit, and Fascia |

2.e.(5) American Gas Association (AGA). Standards and specifications are available from AGA, 1515 Wilson Blvd., Arlington, VA 22209, Ph: 703-841-8556,Fax: 703-841-8406: http://www.aga.org/

2.e.(6) American National Standards Institute, Inc. (ANSI). Copies of the standards listed in Table 2-3 are available from ANSI, 11 West 42nd St., New York, NY 10036, Ph: 212-642-4900, Fax: 212-302-1286: http://www.ansi.org/

**TABLE 2-3 - AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS**

| Std. No. | Std. Description |
|---|---|
| A112.19.1 | Enameled Cast Iron Plumbing Fixtures |
| A112.19.2 | Vitreous China Plumbing Fixtures (DoD Adopted) |
| A112.19.3 | Stainless Steel Plumbing Fixtures (Designed for Residential Use) |
| A112.19.4 | Porcelain Enameled Formed Steel Plumbing Fixtures (DoD Adopted) |
| A112.19.5 | Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards) (DoD Adopted) |
| A161.1 | Recommended Construction and Performance Standards for Kitchen and Vanity Cabinets |
| B16.5 | Steel Pipe Flanges and Flanged Fittings (DoD Adopted) |

**TABLE 2-3 - AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS**

| Std. No. | Std. Description |
|---|---|
| B16.22 | Wrought Copper and Copper Alloy Solder Joint Pressure Fittings (DoD Adopted) |
| B16.26 | Cast Copper Alloy Fittings for Flared Copper Tubes (DoD Adopted) |
| B31.8 | Gas Transmission and Distribution Piping Systems |
| C2 | National Electrical Safety Code |
| ANSI C105 AWWA A21.5 | Polyethylene Encasement for Ductile-Iron Pipe Systems |
| Z21.10.1 | Water Heaters, Gas, Volume I, Storage Type, 75,000 BTUH Input or Less |
| Z21.45 | Flexible Connectors of Other Than All-Metal Construction for Gas Appliances |
| Z60.1 | American Standard for Nursery Stock |
| Z124.1 | Plastic Bathtub Units |
| Z124.2 | Plastic Shower Receptors and Shower Stalls |

2.e.(7) American Plywood Association. APA B840-K-88, 303 Siding Manufacturing Specifications, are available from the American Plywood Association, P.O. Box 11700, Takoma, WA 98411, (206) 565-6600.

2.e.(8) American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) documents, listed in Table 2-4, are available from ASHRAE,1791 Tullie Cir., NE, Atlanta, GA 30329-2305, Ph: 404-636-8400 Fax: 404-321-5478 1791 Tullie Circle, N.E., Atlanta, GA 30329, (404) 636-8400: http://www.ashrae.org/

**TABLE 2-4 – AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR-CONDITIONING ENGINEERS (ASHRAE)**

| No. | Description |
|---|---|
| ASHRAE - | Handbook of Fundamentals |
| ASHRAE - | Residential Cooling Load Calculations |
| ASHRAE 52 | Method of Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter |
| ASHRAE 111 | Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air Conditioning, and Refrigeration Systems |

2.e.(9) American Society of Mechanical Engineers (ASME). ASME B16.11, Forged Fittings, Socket-Welding and Threaded, and ASME B31.8, Gas Transmission and Distribution Systems, are available from ASME, 22 Law Dr., Box 2300, Fairfield, NJ 07007-2900, Ph: 800-843-2763, Fax: 201-882-1717: http://www.asme.org/

2.e.(10) American Society of Sanitary Engineers (ASSE). ASSE 1006, Residential Use (Household) Dishwashers, and ASSE 1008, Food Waste Disposal Units, Household, are available from ASSE, AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE), P.O. Box 40362, Bay Village, OH 44140, Ph: 216-835-3040, Fax: 216-835-3488:

2.e.(11) American Society for Testing and Materials (ASTM). ASTM specifications listed in Table 2-5 are available from ASTM, AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
1916 Race St., Philadelphia, PA 19103, Ph: 215-299-5585, Fax: 215-977-9679: http://www.astm.org/

**TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) SPECIFICATIONS**

| Spec. No. | Spec. Description |
|---|---|
| A53 | Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless |
| A526 | Specification for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality (DoD Adopted) |
| B117 | Method of Salt Spray (Fog) Testing (DoD Adopted) |
| C90 | Specification for Hollow Load-Bearing Concrete Masonry Units (DoD Adopted) |
| C216 | Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) (DoD Adopted) |
| D3676 | Rubber Cellular Cushion Used for Carpet or Rug Underlay |
| D1557 | Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft 2700kN-m/m) |
| D1785 | Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 (DoD Adopted) |
| D2513 | Standard Specification for Thermoplastic Gas Pressure Piping (DoD Adopted) |
| D2683 | Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing (DoD Adopted) |
| D2846 | Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot and Cold-Water Distribution Systems (DoD Adopted) |
| D3018 | Specification for Class A Asphalt Shingles Surfaced with Mineral Granules (DoD Adopted) |
| D3679 | Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding |
| E84 | Standard Test Method for Surface Burning Characteristics of Building Materials (DoD Adopted) |
| E90 | Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions (DoD Adopted)) |
| E108 | Standard Methods of Fire Tests of Roof Coverings |

**TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) SPECIFICATIONS**

| Spec. No. | Spec. Description |
|---|---|
| E119 | Standard Methods of Fire Tests of Building Construction and Materials |
| E162 | Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source (DoD Adopted) |
| E283 | Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors |
| E330 | Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference |
| E336 | Standard Test Method for Measurement of Airborne Sound Insulation in Buildings |
| E547 | Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential |
| E648 | Critical Radiant Flux of Floor-Covering Systems Using a Radiant Energy Source |
| E779 | Measuring Air Leakage by the Pressurization Method |
| E1007 | Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures |
| E1465 | Standard Guide for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings |
| F1292 | Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment |
| E1423 | Standard Practice for Determining the Steady State Thermal Transmittance of Fenestration Systems |
| E 1554 | Determining External Air Leakage of Air Distribution Systems by Fan Pressurization. |
| F1487-98 | Standard Consumer Safety Performance Specification for Playground Equipment for Public Use |
| G90 | Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight |

2.e.(12) American Water Works Association, Inc. (AWWA). Specifications listed below are available from AWWA, 6666 West Quincy, Denver, CO 80235, Ph: 800-926-7337, Fax: 303-795-1989, AWWA C500, Gate Valves for Water and Sewerage Systems (DoD adopted); AWWA C502, Dry-Barrel Fire Hydrants; and AWWA C503, Wet-Barrel Fire Hydrants: http://www.awwa.org/

2.e.(13) Associated Air Balance Council (AABC). AABC MN-1, National Standards for Total System Balance, is available from AABC, 1518 K St., NW, Washington, DC 20005, Ph: 202-737-0202, Fax: 202-638-4833: http://www.aabchq.com/

2.e.(14) American Association of Textile Chemists and Colorists (AATCC). AATCC 134, Electrostatic Propensity of Carpets, is available from AATCC, P.O. Box 12215, Research Triangle Park, NC 27709, (919) 549-8141.: http://www.aatcc.org/

2.e.(15) Builders Hardware Manufacturers Association, Inc. (BHMA). Specifications shown in Table 2-6 are available from the Builders Hardware Manufacturers Association, Inc. (BHMA), 355 Lexington Ave., New York, NY 10017, Ph: 212-661-4261, FAX: 212-370-9047.

**TABLE 2-6 - BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA) SPECIFICATIONS**

| No. | Description (Specs. are DoD Adopted) |
|---|---|
| BHMA 101 | Butts and Hinges |
| BHMA 301 | Door Controls, Closers |
| BHMA 501 | Auxiliary Locks and Associated Products |
| BHMA 601 | Bored and Preassembled Locks and Latches |
| BHMA 611 | Interconnected Locks and Latches |

2.e.(16) Building Officials & Code Administrators International, Inc. (BOCA). The BOCA National Building Code is available from Building Officials & Code Administrators International, Inc., (BOCA), 4051 W. Flossmoor Rd., Country Club Hills, IL 60478-5795, Ph: 708-799-2300, Fax: 708-799-4981: http://www.boca.org/

2.e.(17) Carpet and Rug Institute (CRI). CRI Standard for Installation of Commercial Textile Floor Covering Materials, CRI 104, is available from the Carpet and Rug Institute, 310 Holiday Ave.
P.O. Box 2048, Dalton, GA 30722-2048, Ph: 706-278-0232: http://www.carpet-rug.com/

2.e.(18) Council of American Building Officials (CABO). The CABO One (1) and Two (2) Family Dwelling Code and Model Energy Code, are available from the COUNCIL OF AMERICAN BUILDING OFFICIALS (CABO) 5203 Leesburg Pike, Suite 708, Falls Church, VA 22041, Fax: 703-379-1546: http://www.intlcode.org/

2.e.(19) Electronic Industries Association Telecommunications Industry Association (EIA/TIA). EIA/TIA Standard EIA/TIA-570, is available from Electronic Industries Association, Engineering Department, Order From: Global Engineering Documents, 7730 Carondelet Ave., Suite 407 Clayton, MO 63105, Ph: 800-854-7179, or 714-979-8135, Fax: 314-726-6418

2.e.(20) Illuminating Engineering Society of North America (IESNA). The IESNA Lighting Handbook, is available from Illuminating Engineering Society of North America, (IESNA), 120 Wall St., 17th Floor, New York, NY 10005-4001, Ph: 212-248-5000, Fax: 212-248-5017: http://www.iesna.org/

2.e.(21) International Conference of Building Officials (ICBO). The Uniform Building Code is available from the,

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO), 5360 S. Workman Mill Rd., Whittier, CA 90601-2258, Ph: 310-699-0541, Fax: 310-692-3853: http://www.icbo.org/

2.e.(22) National Association of Architectural Metal Manufacturers Association (NAAMA). NAAMA Metal Finishes Manual, is available from the NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM), 11 So. LaSalle St., Suite 1400, Chicago, IL 60603, Ph: 312-201-0101, FAX: 312-201-0214:

2.e.(23) National Association of Corrosion Engineers (NACE). NACE RP-0286, The Electrical Isolation of Cathodically Protected Pipelines, is available from NACE, P.O. Box 218340, Houston, TX 77218: http://www.nace.org/

2.e.(24) National Association of Plumbing-Heating-Cooling Contractors (NAPHCC). The National Standard Plumbing Code is available from National Association of Plumbing-Heating-Cooling Contractors NAPHCC), 180 S. Washington Street, P.O. Box 6808, Falls Church, VA 22046,
Ph: 800-533-7694, Fax: 703-237-7442: http://www.naphcc.org/

2.e.(25) National Electrical Manufacturers Association (NEMA). NEMA standards listed below are available from the National Electrical Manufacturers Association (NEMA), NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA),2101 L St., NW, Suite 300,Washington, DC 20037-1526
Ph: 202-457-8474 Fax: 202-457-8473 NEMA DC 3, Wall-Mounted Room Thermostats; and NEMA WD 1, General Requirements for Wiring Devices: http://www.nema.org/

2.e.(26) NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), NEBB-01, Procedural Standards for Testing-Adjusting-Balancing of Environmental Systems, is available from NEBB, 875 Grove Mount circle, Gaithersburg, MD 20877-4121, Ph: 301-977-3698, Fax: 301-977-9589: http://www.nebb.org/

2.e.(27) National Fenestration Rating Council (NFRC). NFRC 100-91, Procedure for Determining Fenestration Product Thermal Properties, is available from NFRC, 1300 Spring Street, Suite 500, Silver Spring, MD. Telephone: (301) 589-NFRC, http://www.nrfc.org

2.e.(28) National Fire Protection Association, Inc. (NFPA). NFPA codes listed in Table 2-7 are available from the National Fire Protection Association, Inc. (NFPA), 1Battery March Park, P.O. Box 9101, Quincy, MA 02269. Telephone: (617) 770-3000, Fax: (617) 770-0700: http://www.nfpa.org/

**TABLE 2-7 - NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES**

| Code No. | Code Description |
|---|---|
| NFPA 13 | Installation of Sprinkler Systems |
| NFPA 13R | Installation of Sprinkler Systems in Residential Occupancies Up To and Including Four Stories |
| NFPA 30 | Flammable Liquids Code |
| NFPA 31 | Installation of Oil Burning Equipment |
| NFPA 54 | National Fuel Gas Code |
| NFPA 58 | LP-Gas Storage |
| NFPA 70 | National Electrical Code (DoD Adopted) |
| NFPA 72 | National Fire Alarm Code |

**TABLE 2-7 - NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES**

| Code No. | Code Description |
|---|---|
| NFPA 101 | Life Safety Code |
| NFPA 101M | Alternative Approaches to Life Safety |
| NFPA 255 | Method of Test of Surface Burning Characteristics of Building Materials |
| NFPA 501A | Manufactured Home Installations |
| NFPA 501D | Recreational Vehicle Parks and Campgrounds |
| NFPA 701 | Standard Methods of Fire Tests for Flame Resistant Textiles and Films |

2.e.(29) National Sanitation Foundation, 3475 Plymouth Road, Ann Arbor, MI 48105. Telephone: (313) 769-8010, Fax: (313) 769-8010: http://www.nsf.org/.

2.e.(30) National Wood Window and Door Association (NWWDA) standard, NWWDA I.S.2, Standard for Wood Window Units is available from the National Wood Window and Door Association (NWWDA), 1400 East Touhy Ave., Suite 470, Des Plaines, IL 60018, (847) 299-5200, Fax: (847) 299-1286: http://www.nwwda.org/.

2.e.(31) Sheet Metal and Air Conditioning Contractors National Association (SMACNA). SMACNA Installation Standards for Residential Heating and Air Conditioning Systems and SMACNA-07, HVAC Systems, Testing, Adjusting, and Balancing, are available from SMACNA, 4201 Lafayette Center Drive, Chantilly, VA 22180, (703) 803-2980, Fax: (703) 803-3732: http://www.smacna.org/

2.e.(32) Southern Building Code Congress International, Inc. The Standard Housing Code is available from Southern Building Code Congress International, Inc., 900 Montclair Road, Birmingham, AL 35213-1206. Telephone: (205) 5921-1853, Fax: (205) 591-9775: http://www.sbcci.org/.

2.e.(33) Underwriters Laboratories, Inc. (UL) specifications listed in Table 2-8 are available from the Underwriters Laboratories, Inc. (UL), 333 Pfingston Road, Northbrook, IL 62096. Telephone: (847) 272-8800. Fax: (847) 509-6220: http://www.ui.com/.

**TABLE 2-8 – UNDERWRITERS LABORATORIES SPECIFICATIONS**

| No. | Description (Specs. Are DoD Adopted) |
|---|---|
| UL 58 | Steel Underground Tanks for Flammable and Combustible Liquids |
| UL 174 | Water Heaters, Household Electric Storage Tank Type |
| UL 430 | Waste Disposers |
| UL 507 | Electric Fans |
| UL 555 | Fire Dampers |
| UL 567 | Pipe Connectors for Flammable and Combustible Liquids and LP Gas |

**TABLE 2-8 – UNDERWRITERS LABORATORIES SPECIFICATIONS**

| No. | Description (Specs. Are DoD Adopted) |
|---|---|
| UL 732 | Oil-Fired Storage Tank Water Heaters |
| UL 746C | Polymeric Materials - Use in Electrical Equipment Evaluations |
| UL 749 | Household Dishwashers |
| UL 858 | Household Electric Ranges |
| UL 923 | Microwave Cooking Appliances |
| UL 900 | Test Performance of Air Filter Units |
| UL 1316 | Glass Fiber – Reinforced Plastic Underground Storage Tanks for Petroleum Products |
| UL 1746 | Standard for Safety External Corrosion Protection Systems for Steel Underground Storage Tanks |

**3. SITE PLANNING AND DESIGN.**

3.a. Scope. This project consists of [Insert] housing units on [Insert] of land area. Imaginative site design is encouraged, however, the site boundaries, project composition, and gross density are fixed. Based on the graphic and narrative description of site opportunities and constraints provided, the offeror shall verify that the site meets the program requirements.

3.b. Site Verification. Obtain the site analysis and the documented site opportunities and constraints to verify that the site meets the housing program requirements that are provided. In the event a site analysis has not been accomplished, then an analysis must be performed. The analysis results are documented in a written and graphic summary of site opportunities and constraints for housing.

3.c. Area Development Plan. Provide a housing area development plan that shows the spatial and functional arrangement of all housing requirements. The plan should ensure an economical, compatible and functional residential land use development that utilizes the advantages of the site, fosters visual order, and provides a sense of community. The area development plan shows consideration for the site opportunities and constraints, housing program requirements, and specific site design criteria and guidance provided. The recommendations of the Installation Real Property Master Plan and Installation Design Guide should be addressed.

3.c.(1) Density. The project site is approved for [LOW DENSITY, MEDIUM DENSITY, HIGH DENSITY] siting]. [Edit as appropriate.] Land area for density calculations excludes slopes greater than 10 percent, major highways, flood plains and flood areas, lakes and water courses. Designated major recreation areas greater than 1.2 ha [3 acres] may be excluded from the density calculation.

3.c.(2) Land use. The plan for the area should reflect an optimum balance of housing unit floor area, open space, play lots, neighborhood parks, and pedestrian and vehicular circulation. The plan should show an efficient, organized and economical land use arrangement that is compatible and functional. This plan should show the relationship of the area to adjacent land uses.

3.c.(3) Noise. Use mitigation techniques to moderate predictable noise in accordance with the Installation Compatible Use Zone Program. All possible methods of mitigating the impact to the site and adjacent areas should be explored.

3.c.(4) Buffer area. Provide appropriate buffer areas to separate and visually isolate the community from undesirable external influences and to separate adjacent officer and enlisted personnel housing areas from each other. The width of a street should be a minimum acceptable buffer zone between officer and enlisted personnel housing areas. All possible methods of mitigating the impact to the site and adjacent areas should be explored.

3.c.(5) Housing unit grouping. Variety in groupings, arrangements, and siting configurations of housing units is encouraged to fit varying terrain conditions and to provide compatible and functional residential layouts and street scapes. Building arrangements should be informal and imaginative with setbacks and orientation to provide for the best view, privacy, and variety. The proper grouping of housing units will provide backyard screening, separation of pedestrian and vehicular traffic, play lots, neighborhood parks, and natural open spaces. The layout should reflect simplicity of design and provide a visual sense of community.

3.c.(6) Housing unit variation. Housing unit variation shall afford distinctly different exterior appearances within each housing unit type. Provide stylistic compatibility that will give the neighborhood a sense of order. Housing units shall vary in two or more of the following: Floor plans, massing, elevation, garage location, and exterior materials. One floor plan for each housing unit type is acceptable if sufficient variety is achieved by means of other variations mentioned above. In addition, housing units shall vary in color and siting. A reverse floor plan (mirror-image), although an acceptable means of creating variety, shall not constitute a housing unit change. Offerors shall comply with land-use restraints set forth in this document. To accept the design freedom objective of this RFP, offerors are encouraged to offer 1-story and 2-story construction for detached, duplex, and townhouse units. The preferred colors are earth tones available in commonly used durable materials. The design should reflect life cycle maintenance and energy efficiency.

3.c.(7) Housing unit orientation. Housing units shall be oriented, to the maximum extent possible within the constraints of the site available, so that the long axis of the building is within 20 degrees east or west of true South, so that a major section of the roof faces within 20 degrees of South. The purpose of proper orientation is to expose a minimum surface area to direct solar gain while allowing the units the potential for passive solar applications. Additional consideration will be given during the quality evaluations with respect to unit orientations and passive solar applications considered and included. For additional passive solar information and considerations, see chapter 11 of this Statement of Work. [Edit if necessary where known site constraints preclude compliance with this requirement or if the project under design is a rehabilitation of existing units.]

3.c.(8) Grading. The grading should maintain existing topography while recognizing standard gradients for the housing units and various functions. There should be a balance of the quantity of cut and fill which would create a smooth transition of graded areas into the existing natural site. The plan should reflect selective site clearing that preserves groups of trees. Grading should manage site runoff. The principles of positive drainage should be applied to control the conditions that remove rainfall away from facilities and functions.

3.d. Site Design Criteria. The following specific criteria, based on site density, are to be used as guidance in site design, and proposals will be scored accordingly.

3.d.(1) Housing units per hectare (ha) [acre (ac)] by site density are shown in Table 3-1 on the following page.

**TABLE 3-1 - HOUSING UNITS PER HECTARE [ACRE]**

| Pay Grade | Low Density | | Medium Density | | High Density | |
|---|---|---|---|---|---|---|
| | units/ha | units/ac | units/ha | units/ac | units/ha | units/ac |
| E-6 & Below | 9.9-17.3 | 4-7 | 19.8-24.7 | 8-10 | 22.2-37.1 | 11-15 |
| E-7 - E-9 | 7.4-12.4 | 3-5 | 14.8-22.2 | 6-9 | 19.8-29.7 | 10-12 |
| O-1 - O-3 | 7.4-12.4 | 3-5 | 14.8-22.2 | 6-9 | 19.8-29.7 | 10-12 |
| O-4 - O-5 | 6.2-7.4 | 2.5-3 | 9.9-12.4 | 4-5 | 14.8-22.2 | 6-9 |
| O-6 | 4.9 | 2 | 7.4 | 3 | 9.9-14.8 | 4-6 |
| O-7 & Above | 2.5 | 1 | 4.9 | 2 | 7.4-9/9 | 3-4 |

3.d.(2) Housing unit types by site density are shown in Table 3-2.

**TABLE 3-2 - HOUSING UNIT TYPES BY DENSITY**

| Bedrooms/ Grade | Low Density | Medium Density | High Density |
|---|---|---|---|
| 2 Bedrooms<br>E-1 - E-9<br>W-1 - W-4<br>O-1 - O-3 | 1-2 Floor Duplexes, Townhouses or Apartments | 1-3 Floor Townhouses or Apartments | 2-3 Floor Apartments |
| 3, 4, & 5 Bedrooms<br>E-1 - E-9<br>W-1 - W-4<br>O-1 - O-3 | 1-2 Floor Detached Homes, Duplexes or Townhouses | 1-3 Floor Duplexes or Townhouses | 1-3 Floor Townhouses |
| 3 & 4 Bedrooms<br>O-4 - O-5 | 1-2 Floor Detached Homes, or Duplexes | 1-3 Floor Duplexes or Townhouses | 1-3 Floor Duplexes or Townhouses |
| 4 Bedrooms<br>O-6 - O-9 | 1-2 Floor Detached Homes | 1-3 Floor Detached Homes | 1-3 Floor Detached Homes |

3.d.(3) Maximum number of housing units per building by grade are shown in Table 3-3.

**TABLE 3-3 - MAXIMUM NUMBER OF HOUSING UNITS PER BUILDING BY GRADE**

| Building Types | E-1 - E-6 | E-7 - E-9 & O-1 - O-3 | O-4 - O-5 |
|---|---|---|---|
| Apartments | 12 | 8 | N/A |
| Townhouses | 8 | 6 | 4 |

3.d.(4) Parking requirements by site density.

3.d.(4).(a) Low density: Two off-street stalls and one guest on-street stall per unit.

3.d.(4).(b) Medium density: Two off-street stalls and 0.5 guest on-street stall per unit.

3.d.(4).(c) High density: Two off-street stalls and 0.25 guest on-street stalls per unit.

3.d.(4).(d) Recreational vehicle (RV) storage: (Where required; prohibited at high density sites.) One 3.0 m x 6.0 m [10 ft by 20 ft] space per 20 housing units. The area shall include 2.0 m [6 ft] high chain link security fencing and security flood lighting of 2.7 Lx [0.25 foot candles] at the boundary fence. Area shall have an all-weather surface and an access drive. Design shall permit access to all spaces without moving other vehicles.

3.d.(5) Children's outdoor play areas. Children's outdoor play areas are a requirements per number of housing units. See paragraph 3.g. for size and equipment specifications.

3.d.(5).(a) Play lot: One 325 $m^2$ [3,500 $ft^2$] play lot per 30 housing units. The play lot shall be designed to accommodate two age groups; 6 weeks to 5 years age group and 5 to 9 years age group. The play lot shall have a

capacity for approximately 15 to 35 children. These play lots should be located within site lines of the housing units.

3.d.(5).(b) Neighborhood park: One 700 $m^2$ [7,500 $ft^2$] neighborhood park per 150 housing units. The neighborhood park shall be designed to accommodate two age groups; 5 to 9 years age group and 9 to 15 years age group. The neighborhood park shall have a capacity for approximately 30 to 50 children.

3.e. Building Setbacks and Spacing. Clearances between and adjacent to buildings must consider requirements for fire protection, safety, privacy, and emergency access in addition to the following minimum criteria. Setback or yard dimensions shall be from the building wall to an imaginary lot line around each building measured perpendicular to the building. Wall lengths with horizontal offsets of 1.8 m [6 ft] or more may be measured separately when determining yard depth. Distance between buildings shall be not less than the sum of setbacks or yards, as required.

3.e.(1) Minimum setbacks and spacing for low density sites is shown in Table 3-4.

**TABLE 3-4 - MINIMUM SETBACKS AND SPACING, LOW DENSITY SITES**

| Description | Meters | [Feet] |
|---|---|---|
| From front of house to curb of residential street. | 7.5 | 25 |
| From house to major/arterial highway. (Edge of pavement) | 45.0 | 150 |
| From house to collector street. (Edge of pavement) | 30.0 | 100 |
| Side of carport or garage to curb. | 6.0 | 20 |
| Side of house to curb[1]. | 6.0 | 20 |
| Between sides of carports or garages and houses[1]. | 1.5 | 5 |
| Between outside walls of houses[1]. | 6.0 | 20 |
| Between rear walls of houses. | 24.0 | 80 |
| Between side and rear walls of houses. | 12.0 | 40 |
| Between street face of carport or garage and curb or sidewalk when second off- street parking space is next to garage or carport. | 2.4 | 8 |
| Between street face of carport or garage and curb or sidewalk when second off-street parking space is between carport or garage and street. | 8.5 | 28 |

Note[1]: When patios are located within a yard, separation shall not be less than 12.0 m [40 ft].

3.d.(2) Minimum setbacks and spacing for medium and high density sites.

3.d.(2).(a) Wall Definitions

3.d.(2).(a).1/ Wall A contains the housing unit main entrance; or the principal window(s) of the living room, dining room, family room, or a balcony.

3.d.(2).(a).2/ Wall B contains window(s) other than in wall 'A.'

3.d.(2).(a).3/ Wall C contains no windows.

3.d.(2).(b) Building to Building (each yard).

3.d.(2).(b).1/ Wall A: 1.8 m [6 ft] + 0.6 m [2 ft] for each level + 5 percent wall length.

3.d.(2).(b).2/ Wall B: 1.2 m [4 ft] + 0.3 m [1 ft] for each level + 5 percent wall length.

3.d.(2).(b).3/ Wall C: 2.25 m [7 ft 6 in] minimum.

3.d.(2).(c) Building to Street (face of curb)

3.d.(2).(c).1/ Wall A: 6.0 m [20 ft].

3.d.(2).(c).2/ Wall B: 4.5 m [15 ft].

3.d.(2).(c).3/ Wall C: 3.0 m [10 ft].

3.d.(2).(d) Garage to Street (face of curb). Detached garages may be located up to the property line or the project boundary.

3.d.(2).(d).1/ Front: 2.4 m [8 ft] (without parking).

3.d.(2).(d).2/ Side or Back: 4.5 m [15 ft].

3.d.(2).(e) Driveway length for parking, measured from face of curb.

3.d.(2).(e).1/ To park one car: 6.0 m [20 ft].

3.d.(2).(e).2/ To park two cars: 12.0 m [40 ft].

3.d.(2).(f) Building to retaining wall with a height of 1.2 m [4ft] or more, above a floor with windows.

3.d.(2).(f).1/ Wall A: 4.5 m [15 ft].

3.d.(2).(f).2/ Wall B: 2.25 m [7 ft 6 in].

3.d.(2).(f).3/ Wall C: 1.5 m [5 ft].

3.d.(3) Setback Notes.

3.d.(3).(a) Where the slope is 3:1 or steeper, top and toe of slope shall be a minimum of 4.5 m [15 ft] from the building.

3.d.(3).(b) Courts, outer and inner, shall have dimensions not less than the sum of the required yard distances. An inner court shall have a minimum area of 9.29 $m^2$ [100 $ft^2$] for a one-story building and an additional 4.64 $m^2$ [50 $ft^2$] for each additional story.

3.f. Circulation, Parking, and Bus Stops. The vehicular and pedestrian circulation system shall promote safe, efficient movement of vehicles and pedestrians within the housing area. It should maintain the maximum separation of vehicles and pedestrians. Safe circulation systems have a clear hierarchy of movement, lead to a clear destination, and do not interrupt other functions. The following criteria shall be considered for designing streets and drives for vehicles and pedestrians:

3.f.(1) Vehicular circulation. Vehicular circulation layout is determined by applying the design vehicle templates to the site design. The passenger car class includes passenger cars and light delivery trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational - privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semitrailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Templates showing the turning movements for design vehicles are provided by the American Association of State Highway and Transportation Officials (AASHTO). Design site entrances, exits, service drives, and special circulation areas to accommodate the largest vehicle that uses the area. In the case of family housing the largest vehicle to use the area on a weekly basis would be the 12 m (40 ft) garbage truck. Provide the vehicle clearances that are required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Streets shall include required traffic control and street identification signage, maximum spacing between drives, right-angle turns, and limit points of conflicts between traffic.

3.f.(1).(a) Definitions.

3.f.(1).(a).1/ Nonresidential Streets

3.f.(1).(a).1/.a/. Arterial. Major roads and street systems external to the residential area.
3.f.(1).(a).1/.b/. Collector. Feeder street connecting external street system with residential streets in the subdivision and adjoining areas subject to future development. No houses shall be located on collector streets, and no driveway or access shall be from collector streets

3.f.(1).(a).2/ Residential Streets

3.f.(1).(a).2/.a/. Loop. Both ends open to traffic.
3.f.(1).(a).2/.b/. Cul-De-Sac. Only one end open to access street and a turnaround (T, Y, or Circle) at the other end.

3.f.(1).(b) Cul-De-Sac Design. The circulation system may be based on cul-de-sacs a maximum 182.8 m [600 ft] long, measured from the center of the cul-de-sac to the centerline of the access street.

3.f.(1).(c) Intersection Design. Provide "T" intersection offsets of at least 38.1 m [125 ft]. The preferred angle of intersection is right-angle (90 degrees).

3.f.(2) Street design. Street dimensions are determined by the selected design vehicle templates. Separation, corner clearances, and sight distance are established when the design vehicle templates and speed limits are selected. Streets shall be designed for vehicles with not less than 2721.5 kg [6,000 lb] code wheel load. Streets shall be provided with concrete curbs and gutters. Curbs shall be depressed at entrances to driveways unless the rolled type of curbs are provided throughout. All gradients shall provide positive drainage with no ponding.

3.f.(3) Housing unit access drive. Access drives should provide traffic safety distances which allow safe entry and exit. Access drives serving more than 8 housing units, or subject to service and emergency truck traffic shall be designed as a street.

3.f.(4) Privately owned vehicle (POV) parking. POV stalls without vehicle overhang shall be a maximum 2.7 m x 5.5 m [9 ft x 18 ft]. The design vehicle template that is used to design this space shall be described. Design on-street parking stalls to be of sufficient length and width to allow safe movement into and out of the stall and to adequately separate the parked vehicle from the traffic flow. Provide compact passenger car dimensions only when recommended by a Site Traffic Impact Study.

3.f.(4).(a). Housing unit POV parking. POV parking areas consisting of more than 4 vehicles backing into the street are unacceptable.

3.f.(4).(b). Off-street parking lots. A 90-degree parking layout is preferable. Maintain two-way movement and avoid dead-end parking lots. Provide more than one entrance and exit drive. In large parking lots provide a minimum 10 percent of the total paved area for landscape plant material.

3.f.(5). Bus stops. Bus stops shall be provided along collector streets at intersections with residential streets. Bus stops shall be in compliance with the Installation Design Guide and located with a turnout from the collector street. The design vehicle that is used to design this space shall be described. [Number of bus stops required shall be in accordance with installation requirements.]

3.f.(6). Pedestrian circulation. Pedestrian circulation should be safe, separated from vehicle circulation, and relate to the housing units, parking, and community facilities. Pedestrian circulation should be based on pedestrian desired lines of walking between facilities. Desired lines should be weighted to predict the most traveled routes. These routes would require paving. Topography and vegetation can be used to reinforce a sense of movement. Design pedestrian concentration areas with adequate paved area.

3.f.(7). Sidewalk design. Sidewalks shall be provided on both sides of the street. Walks shall be a minimum of 1.2 m [4 ft] wide exclusive of curb width, and made of non-reinforced concrete with a minimum thickness of 100 mm [4 in]. Where walks are adjacent to the curb, the curb width is not to be included as sidewalk. Ramps for handicapped individuals shall be provided at intersections by depressing street curbs and adjacent sidewalk.

3.g. Children's Outdoor Play Areas. The design of the children's outdoor play areas shall comply with the safety requirements of ASTM F 1487 and ASTM F 1292. The children's outdoor play areas are unsupervised play areas and do not have a supervised play program for child development. These areas are not part of trained recreation, youth center or child development staff support. Supervised outdoor play areas occur at youth centers and child development centers.

3.g.(1). Child Safety and Accessibility.

3.g.(1).(a). Accessibility to children and adults with disabilities. Play areas shall be accessible to children and adults with disabilities. In addition to wheelchair users, the needs of children and adults who walk with canes, walkers, or crutches; who have limited use of the upper body; who have visual or hearing disabilities, or who have developmental disabilities shall be considered. Design criteria based on child dimensions should be used for the proper functioning of the play area. Every part of a play area may not be accessible to all its users, but the social experience provided should be accessible to everyone. When more than one play activity of the same type is provided, one shall be accessible. When one activity is provided, it shall be accessible. A diverse play area has the greatest potential for meeting the needs of all users. Separate play areas for the physically challenged are not acceptable. Integrating all children in the same play setting will be emphasized. Guidelines available from this design district for accessible routes, ramps for wheelchair access, transfer points, wheelchair accessible platforms, and accessible stepped platforms should be followed.

3.g.(1).(b). Age appropriate scale. Age appropriate scale is a term used to describe equipment which will allow safe and successful use by children of a specific chronological age, mental age, and physical ability. Play equipment height and complexity will not exceed the user's ability. The children's outdoor play areas will meet age appropriate scale for the age groups that the areas are designed to accommodate.

3.g.(1).(c). Use zones. In accordance with ASTM F 1487, a use zone is a clear, unobstructed area under and around play equipment where a child would be expected to land when jumping or falling from a piece of play equipment. These zones require a playground safety surface in accordance with ASTM F 1292. Requirements for use zones vary for the age group and for different pieces of equipment. All use zones for play equipment should be shown on the site plan to ensure there is no conflict between play activities on the ground and swinging or jumping from the equipment. Use zones will not overlap except for spring rocking equipment, balance beams, and play houses.

3.g.(1).(d). Playground safety surface. A playground safety surface is constructed of a material that meets the shock absorbency criteria recommended in ASTM F 1292. Playground safety surfaces shall be provided throughout all use zones and under all play equipment as required.

3.g.(1).(e). Inappropriate play events. The following play events are not appropriate for use in unsupervised play areas; Chain walks, chain or tire climbers, fulcrum seesaws, log roles, May poles, merry-go-rounds, rotating equipment, spring rocking equipment intended for standing, swinging exercise bars, trapeze bars, and whirls.

3.g.(2). Play lot. Provide play lots that are located within the site lines of the housing units to be supported. Connect play lots to the units by a walkway system. Provide shade. Each play lot shall be provided with the following age appropriate play events and equipment for the two age groups to be accommodated:

3.g.(2).(a). Pathway. The pathway should encompass the perimeter of the area, accommodate wheeled toys, and consist of different textures, colors, and patterns for games.

3.g.(2).(b). Gathering place. This setting provides an open space for groups of different sizes and people of all ages. Provide an infant crawl area. The seating materials may include boulders, timbers or logs arranged with vegetation to create a room like atmosphere. A shelter may be provided.

3.g.(2).(c). Sand play setting. This setting supports creative play and social interaction. It provides children with a manipulative play environment. The play elements include sand, water, sand tables, containment barriers and boulders. The sieve size for sand should consist of a fine washed plaster sand. The sand used here is not the same sieve size as the sand used for the use zones. This setting should be located adjacent to the play village.

3.g.(2).(d). Play village. This setting supports a playhouse and a water source. It should be located adjacent to the sand play setting.

3.g.(2).(e). Dramatic play setting. This setting supports dramatic play elements such as playhouses, play platforms, and an open area for seating on the ground.

3.g.(2).(f). Manufactured play equipment setting. This setting includes an age appropriate composite structure consisting of multiple play events for each of the following age groups; 12 months to 2 years of age, 2 to 5 years of age, and 5 to 9 years of age. Other play events include free standing equipment such as spring rocking equipment, swing, and balance beam. The swing should be located as a free standing play event on the perimeter.

3.g.(3). Neighborhood park. Provide neighborhood parks that are to be located on the edge of the housing unit area to be supported. Connect neighborhood parks to the housing units by a walkway system. Provide shade. Each neighborhood park shall be provided with the following age appropriate play events and equipment for the two age groups to be accommodated:

3.g.(3).(a). Pathway. The pathway should encompass the perimeter of the area, accommodate wheeled toys, and consist of different textures, colors, and patterns for games.

3.g.(3).(b). Gathering place. This setting provides an open space for groups of different sizes and people of all ages. The seating materials may include boulders, timbers or logs arranged to create a room like atmosphere. Additional points will be given for providing a picnic shelter.

3.g.(3).(c). Manufactured play equipment setting. This setting includes an age appropriate composite structure consisting of multiple play events for children 5 to 15 years of age. Other play events include free standing equipment such as spring rocking equipment, swing, track ride, and balance beam. The swing should be located as a free standing play event on the perimeter.

3.g.(3).(d). Sports and games setting. This setting includes a turf area as the central element of the park. The turf area should accommodate various sports activities. Locate a multi-use hard surface area on the perimeter. Other design elements include surfacing, fences, drinking fountains, storage, lighting, seating, and trash receptacles.

3.g.(4). Plant materials. Plants and ground cover should be integrated into play settings. Plants provide a variety of learning opportunities, as they become a source for play material for crafts, dramatic play, and sensory experience. Plants define space and provide shade. Poisonous plants and plants with thorns are not allowed and should be removed from the play areas.

3.h. Landscape Planting Plan. The offeror shall obtain and use the services of a qualified landscape architect, experienced in site planning and planting design. A complete, integrated landscape planting plan shall be provided

for the overall housing project. The design shall reflect appropriate groupings, foundation plantings, and street tree plantings to define the open spaces to ensure a complete landscaped project. Choose plant materials on the basis of plant hardiness, climate, soil conditions, low maintenance, and quality. Selected plant materials shall be easily maintained and tolerant of the specific site conditions. Planting or seeding shall occur only during periods when beneficial results can be obtained.

3.h.(1). Trees, shrubs, and ground cover. Plant varieties shall be nursery grown or plantation grown stock conforming to ANSI/ANLA Z60.1. They shall be grown under climatic conditions similar to those in the locality of the project.

3.h.(1).(a). Quality. Well shaped, well grown, vigorous, healthy plants having healthy and well branched root systems shall be provided. Plants shall be free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement, and abrasion. Plants shall be provided that are typical of the species or variety, and conforming to standards as set forth in ANSI/ANLA Z60.1.

3.h.(1).(a).1/. Shade and flowering trees. A height relationship to caliper shall be provided as recommended by ANSI/ANLA Z60.1. Height of branching should bear a relationship to the size and variety of tree specified, and with the crown in good balance with the trunk. Trees shall not be "poled" or the leader removed.

3.h.(1).(a).1/.a/. Single stem. Trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.
3.h.(1).(a).1/.b/. Multi-stem. All countable stems, in aggregate, shall average the size specified. To be considered a stem, there should be no division of the trunk which branches more than 150 mm [6 in] from the ground level.
3.h.(1).(a).1/.c/. Specimen. A plant shall be provided that is well branched and pruned naturally according to the species. The form of growth desired, which may not be in accordance with natural growth habit, shall be as indicated.

3.h.(1).(a).2/. Deciduous shrub. Plants shall be provided that have the height and number of primary stems as recommended by ANSI/ANLA Z60.1 An acceptable plant shall be well shaped with sufficient well-spaced side branches recognized by the trade as typical for the variety grown in the region.

3.h.(1).(a).3/. Coniferous evergreen. Trees shall be provided that have the height-to-spread ratio as recommended by ANSI/ANLA Z60.1. Trees shall not be "poled" or the leader removed. An acceptable plant shall be exceptionally heavy, well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be as indicated.

3.h.(1).(a).4/. Broadleaf evergreen. Plants shall be provided that have ration of height-to-spread as recommended by ANSI/ANLA Z60.1. An acceptable plant shall be well shaped and recognized by the trade as typical for the variety grown in the region.

3.h.(1).(a).5/ Ground cover. Plants shall be provided with the minimum number of runners and length of runner as recommended by ANSI/ANLA Z60.1. Plants shall be furnished that have heavy, well developed, and balanced top with vigorous well developed root system, and shall be furnished in containers.

3.h.(1).(b). Measurement. Plant measurements shall be in accordance with ANSI/ANLA Z60.1.

3.h.(1).(c). Percolation test. Test for percolation shall be done to determine positive drainage of plant pits and beds. All soil and drainage conditions detrimental to the growth of plant material shall be identified and a proposal correcting the conditions shall be submitted.

3.h.(1).(d). Soil test. A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of plant material specified.

3.h.(1).(e). Installation. Verify the location of underground utilities. When obstructions below ground or poor drainage affect the planting operation, proposed adjustments to plant location, type of plant, and planting method or

drainage correction shall be submitted. The plant material shall be installed during appropriate planting times and conditions recommended by the trade for the type and variety of plant material specified. Plant pits shall be excavated and backfilled as recommended by the trade and ANSI/ANLA Z60.1. The planting operation shall be performed only during periods when beneficial results can be obtained. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted.

3.h.(1).(f). Pruning. The total amount of foliage shall be pruned by one-fourth to one-third on installed trees and shrubs to compensate for loss of roots and transplanting shock. The typical growth habit of individual plants shall be retained. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off."

3.h.(1).(g). Maintenance during planting operation. Installed plants shall be maintained in a healthy growing condition. Maintenance operations shall begin immediately after each plant is installed and shall continue until the plant establishment period commences.

3.h.(1).(h). Plant establishment period. On completion of the last day of the planting operation, the plant establishment period for maintaining installed plants in a healthy growing condition shall commence and shall be in effect for the remaining contract time period not to exceed 12 months. When the planting operation extends over more than one season or there is a variance to the planting times, the plant establishment periods shall be established for the work completed.

3.h.(1).(i). Maintenance during establishment period. The maintenance of plants shall include straightening plants, tightening stakes and guying material, repairing tree wrap, protecting plant areas from erosion, maintaining erosion material, supplementing mulch, accomplishing wound dressing, removing dead or broken tip growth by pruning, maintaining edging of beds, checking for girdling of plants and maintaining plant labels, watering, weeding, removing and replacing unhealthy plants.

3.h.(1).(j). Unhealthy plant. A plant shall be considered unhealthy or dead when the main leader has died back, or 25 percent of the crown is dead. Determine the cause for an unhealthy plant. Unhealthy or dead plants shall be removed immediately and shall be replaced as soon as seasonal conditions permit in accordance with the following warranty paragraph.

3.h.(1).(k). Warranty. Furnished plant material shall be guaranteed to be in a vigorous growing condition for a period of 12 months regardless of the contract time period. A plant shall be replaced one time under this guarantee. Transplanting existing plants requires no guarantee.

3.h.(2). Turf. Turf consists of seed, sod, and sprigs. There may be several different types of turf mixtures applied; one for lawn areas around housing units and one for field or recreation areas. The boundaries of each area shall be clearly defined on the planting plan.

3.h.(2).(a). Seed quality. State approved seed of the latest season's crop shall be provided in the original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with applicable State seed laws. Seed mixtures shall be proportioned by weight. Weed seed shall not exceed one percent by weight of the total mixture.

3.h.(2).(b). Sod. State approved sod shall be provided as classified by applicable State laws. Each individual sod section shall be of a size to permit rolling and lifting without breaking.

3.h.(2).(b).1/. Quality. The sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 50 mm [2 in] in any dimension, woody plant roots, and other material detrimental to a healthy stand of turf. Sod that has become dry, moldy, or yellow from heating, or has irregular shaped pieces of sod and torn or uneven ends shall be rejected.

3.h.(2).(b).2/. Thickness. Sod shall be machine cut to a uniform thickness of 306 mm [1ft 1/4 in] within a tolerance of 6 mm [1/4 inch] excluding top growth and thatch. Measurement for thickness shall exclude top growth and thatch.

3.h.(2).(b).3/. Time limitation. The limitation of time between harvesting and placing sod shall be 36 hours.

3.h.(2).(c). Sprig quality. The cultivar shall be provided as healthy living stems, stolons, or rhizomes with attached roots, including two or three nodes, and shall be from 100 mm to 150 mm [4 in to 6 in] long, without adhering soil. Sprigs shall be provided which have been grown under climatic conditions similar to those in the locality of the project. Sprigs shall be obtained from heavy and dense sod, free from weeds or other material detrimental to a healthy stand of turf. Sprigs that have been exposed to heat or excessive drying shall be rejected. The time limitation between harvesting and placing sprigs shall be 24 hours.

3.h.(2).(d). Soil test. A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

3.h.(2).(e). Temporary turf cover. When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, the areas designated for turf shall be seeded with a temporary seed. When no other turfing materials have been applied, the quantity of one-half of the required soil amendments shall be applied and the area tilled.

3.h.(2).(f). Installation. The turf shall be installed during appropriate planting times and conditions recommended by the trade for the type and variety of turf specified. The turf operations shall be performed only during periods when beneficial results can be obtained. Drainage patterns shall be maintained. The turf shall be installed by using the methods as recommended by the trade for the type and variety of turf specified.

3.h.(2).(g). Protection. Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required.

3.h.(2).(h). Turf establishment period. The turf establishment period for establishing a healthy stand of turf shall begin on the first day of work under the turfing contract and shall end three months after the last day of the turfing operation. An unsatisfactory stand of turf shall be repaired as soon as turfing conditions permit.

3.h.(2).(i). Satisfactory stand of turf.

3.h.(2).(i).1/. Seeded lawn area. A satisfactory stand of turf from the seeding operation for a lawn area is defined as a minimum of 160 grass plants per square meter. Bare spots shall be no larger than 150 mm [6 in] square. The total bare spots shall not exceed two (2) percent of the total seeded area.

3.h.(2).(i).2/. Seeded field area. A satisfactory stand of turf from the seeding operation for a field area is defined as a minimum of 100 grass plants per square meter. The total bare spots shall not exceed two (2) percent of the total seeded area.

3.h.(2).(i).3/. Sodded area. A satisfactory stand of turf from the sodding operation is defined as living sod uniform in color and texture. Bare spots shall be no larger than 50 mm [2 in] square.

3.h.(2).(i).4/. Sprigged area. A satisfactory stand of turf from the sprigging operation is defined as a minimum of 20 sprigs per square meter. Bare spots shall be no larger than 225 mm [9 in] square. The total bare spots shall not exceed two (2) percent of the total sprigged area.

3.h.(2).(i). Maintenance during establishment period. The maintenance of the turfed areas shall include eradicating weeds, eradicating insects and diseases, protecting embankments and ditches from erosion, maintaining erosion control materials and mulch, protecting turf areas from traffic, mowing, watering, post-fertilization, and replacing unsatisfactory turf areas.

3.i. Sprinkler and/or Irrigation system. [Use of a sprinkler and/or irrigation system should be included in only in arid regions for the protection of landscape plantings. Coordinate requirements with the installation. Insert "....(DELETED)." and delete remainder of text if not needed.] Provide a complete permanent automatic irrigation system with controllers covering all common planting areas and slopes. Design the system to function with available water pressure.

**4. SITE ENGINEERING.**

4.a. Soils.

4.a.(1). Soil and Foundation Report (Geotechnical Report). A preliminary Soil and Foundation Report is provided as part of this RFP. A drawing indicating Subsurface Explorations and Geologic Profiles for the proposed site is also provided. The report provides an overview of soils and geologic conditions, and is furnished for informational purposes only. The offeror to whom this contract is awarded shall, with his or her consulting professional geotechnical engineer experienced in geotechnical engineering, be responsible for determining site specific geotechnical conditions.

4.a.(1).(a). The Contractor provided site specific geotechnical conditions report shall include, but not be limited to:

4.a.(1).(a).1/. Classification of soil and rock.

4.a.(1).(a).2/. Depth to bedrock.

4.a.(1).(a).3/. Extent of boulders.

4.a.(1).(a).4/. Bearing capacity of soil and rock.

4.a.(1).(a).5/. Settlement potential.

4.a.(1).(a).6/. Compaction requirements.

4.a.(1).(a).7/. Groundwater characteristics.

4.a.(1).(a).8/. Infiltration and permeability.

4.a.(1).(a).9/. Erosion and siltation.

4.a.(1).(a).10/. Surface and subsurface drainage.

4.a.(1).(a).11/. Soil resistivity.

4.a.(1).(a).12/. Other [Insert any site specific requirements.]

4.a.(1).(b). The offeror and his or her professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the site specific geotechnical conditions. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the 50 percent design submission. If revisions are made to the 50 percent design submission, a new certification shall be provided with the final design submission.

4.a.(2). Soil compaction.

4.a.(2).(a). Soil compaction shall be achieved by equipment approved by a professional geotechnical engineer. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the compaction specified with the equipment used. Compact each layer to not less than the percentage of maximum density specified in Table 4-1, determined in accordance with ASTM D 1557 Method D.

**TABLE 4-1 – SOIL COMPACTION**

| Subgrade Preparation, Fills, Embankments, and Backfills | Compaction Requirements (Percentage of Maximum Density) |
|---|---|
| Structures & Building Slabs | 90 |
| Streets, Paved Areas, Bike Paths | 90 |
| Sidewalks | 85 |
| Grassed Areas | 80 |

4.a.(2).(b). The requirements shall be verified or modifications recommended by the consulting professional geotechnical engineer in the report wherever engineering, soils, or climatic factors indicate the necessity. Any modification to the stated compaction requirements shall require the approval of the Contracting Officer.

4.a.(3). Capillary water barrier. A capillary water barrier is required for all interior slabs on grade, including garages, carports and storage rooms. As a minimum, the capillary water barrier shall [Define minimum requirements.]

4.a.(4). Soil treatment. [If not required insert "...(DELETED)." and delete remainder of text.] Soil treatment for termites shall be by the chemical method. Methods and extent of protection required are as follows: [Insert project specific requirements.]

4.a.(5). Decay treatment. Decay treatment shall apply to the following: [Insert project specific requirements.]

4.a.(6). Radon mitigation. The design and construction of foundation walls, slabs, and crawl spaces shall include provisions for the reduction of radon entry and facilitate its removal. Radon mitigation shall comply with the requirements of ASTM E1465. [If not required, insert "...Deleted"." and delete remainder of text.
Design District technical specialists can contact Mr. David Price of EPA's Indoor Environments Division, 202-564-9447 regarding suggested language concerning indoor air quality and radon mitigation].

4.b. Water Distribution System. Connection to the existing water distribution system shall be made at the locations shown on the RFP drawings.

4.b.(1). Water Mains and Building Service Connections. Mains shall be considered as that part of the distribution system supplying fire hydrants, or fire hydrant laterals. Service connections supply water from the main to the building. Mains shall be looped with no dead ends and be of adequate size to satisfy both domestic and fire flow requirements. Minimum main size is 0.15 m [6 in]. Sufficient sectional control valves shall be provided so that no more than two fire hydrants will be out of service in the event of a single break in a water main. A copper tracer wire shall be placed directly above all non-metallic mains when plastic marking tape does not provide means of determining alignment of pipe by metal detecting equipment. The pipe, valves, and all other materials shall meet the American Water Works Association (AWWA) standards for a 1,034.2 kPa [150 psi] working pressure system. Provide sacrificial anodes for all valves and metal pipe. Building connections shall be designed and constructed in accordance with the National Standard Plumbing Code.

4.b.(2). Flow requirements. Water must be supplied by mains of appropriate capacity to provide 37.9 L/s [500 gpm] at one-story units, 56.8 L/s [750 gpm] at two-story structures, and 75.8 L/s [1,000 gpm] at structures which are three or more stories high, for a flow duration of 1-1/2 hours. This mandatory flow is over and above domestic requirements. Domestic requirements shall be based on 1135.6 liters/day (300 gal/day) per housing unit for single family housing, and 946.3 liters/day (250 gal/day) per housing unit for multi-family housing. Mains shall be sized to carry this flow with a 2.5 peak hourly factor. Pressure shall be a minimum of 137.9 kPa [20 psi] at each fire hydrant, and a maximum of 1,034.2 kPa [150 psi] at each outlet after allowing for friction, elevation, and other pressure losses. Pressure at each housing unit shall not exceed 517.1 kPa [75 psi].

4.b.(3). Trenches. Water and gas mains may be installed in the same trench, with the gas main placed on a shelf at least 0.3 m [12 in] above and to one side of the water mains. (Coordinate with the local gas utility supplier to determine system acceptability). Water mains shall have a minimum of 0.9 m [3 ft] of earth cover. Minimum cover above water lines shall be 0.75 m [2 ft 6 in] in grassed areas and 0.9 m [3 ft] in paved areas. Adequate cover must be provided for freeze protection. Where frost penetrates to a depth greater than the minimum above, greater cover will be required. Sufficient cover must also be provided to protect the pipe against structural damage due to superimposed surface loads. Lines laid lower than the minimums stated shall be concrete encased with a minimum concrete thickness of 0.15 m [6 in].

4.b.(4). Fire hydrants. Hydrants shall conform to AWWA C502, Dry-Barrel Fire Hydrants, or AWWA C503, Wet-Barrel Fire Hydrants, except as required by the local utility supplier. Valves shall conform to AWWA C500, Gate Valves for Water and Sewerage Systems. Fire hydrants shall be compatible with those presently in use at the installation or local Government Juridicant, with similar pump and hose connections. Fire hydrant spacing shall be no greater that 152 m [500 ft] apart, by paved road. In addition, a hydrant shall be provided so that all parts of the housing units can be reached by hose lines not over 107 m [350 ft] long. Hydrant laterals shall be 0.15 m [6 in] minimum size, shall not exceed 15.2 m [50 ft] in length, and shall have an underground shutoff valve. Valve box, at each lateral, shall be located within 3 m [10 ft] of the hydrant, and shall not be located where obstructed by parked vehicles, shrubbery, etc. Guard post barriers shall be provided where hydrant locations are subject to vehicle damage.

4.b.(5). Shutoff valve. Each building shall be provided with a separate service and main shutoff valve, readily accessible to maintenance and emergency personnel. Shutoff valves in walks are prohibited.

4.c. Sanitary Sewerage System. Connection to the existing sewage collection system shall be made at the location shown on the RFP drawings. Sewage collection systems shall be designed and constructed in accordance with the National Standard Plumbing Code criteria in this paragraph, and installation requirements. Pipe sizes and slopes shall be calculated using the Manning Formula. Manholes are required at all changes of direction and spaced not more than 152 m [500 ft] apart. Curved sewers are prohibited. Pipes shall be designed to flow full and maintain a minimum velocity of 0.6 m [2 ft] per second. If siphons are used, two lines of equivalent capacity shall be used with cleanouts. Where pumping is required, force mains shall be sized to minimize pumping head, with a 0.9 m to 1.5 m [3 ft to 5 ft] per second velocity.

4.c.(1). Sewer mains. Design shall be based on an average daily per capita flow of sanitary sewage of 378.5 L [100 GAL] per day with a 4.0 peak hourly factor. Mains shall be a minimum of 0.2 m [8 in] in diameter.

4.c.(2). Sewer Building Laterals. Each building lateral shall be connected directly to a sewer main. Combining multiple building laterals is prohibited. Apartment units within a building may use a single building lateral. Cleanouts shall be provided to allow cleaning of all lines to grade. Cleanouts, in yard areas, shall be set in a box with a hinged cover. Laterals from one building shall not cross under another building. Lines shall be sized in accordance with the National Standard Plumbing Code. Sewer laterals serving one or two housing units shall be a minimum of 0.15 m [6 in] in diameter. Laterals serving three or more housing units shall be a minimum of 0.2 m [8 in] in diameter.

4.c.(3). Trenches. Sewer and water lines, mains or laterals, shall be placed in separate trenches. The separate trenches shall maintain a minimum lateral separation of 3.0 m [10 ft].

4.c.(4). Cover. Sewer lines shall be located at a depth greater than the frost penetration. Minimum cover above the top of pipes shall be 0.6 m [2 ft] in areas not subject to vehicular loads and 0.9 m [3 ft] in all other areas. If the minimum cover can not be met, the length of pipe shall be concrete encased with a minimum 0.07 m [3 in] thickness of concrete

4. d. Storm Drainage System. The storm drainage system shall be properly coordinated with surrounding properties to ensure that runoff does not cause damage to other properties. All drainage lines, if required, shall remain in conduit to stable grade. The minimum velocity of flow in conduits during a design storm shall be 0.07 m/s [2 ft 6 in/s]. Storm water collection, disposal (and retardation) system shall be designed for a minimum of a 10-year return frequency. Rainfall intensities for project locations shall be in accordance with local community/locatity/State

Transportation (Highway) agency design parameters.

4.d.(1). Site specific storm drainage criteria. [Insert site specific requirements such as local and State requirements limiting runoff, permit requirements, etc.]

4.d.(2). Manholes. Manholes shall be located at intersections and changes in alignment or grade. Intermediate manhole maximum spacing shall be 76.2 m [250 ft] for pipes 0.9 m [3 ft] or less in diameter or box drains with the smallest dimension less than 0.9 m [3 ft]. Maximum spacing for intermediate manholes on larger pipes and drain boxes shall be 152 m [500 ft]. Manholes shall be precast concrete and shall conform to ASTM C 478 or AASHTO M 199. Steel ladders shall be installed where the depth of the manhole exceeds 0.9 m [3 ft]. The ladder shall be galvanized after fabrication in accordance with ASTM A 123. The wall along the ladder shall be vertical. The manhole shall have a 0.6 m [2 ft] minimum opening as measured from the face of the steel ladder.

4.d.(3). Drainage of roads and pavements. Provide a positive crown or sheet drainage to all streets and roads. Pavement collectors for storm water shall be by curb inlets and gutters. Open areas shall be drained by field inlets and an underground collection system. No roadside ditches shall be permitted. Overland flow shall be held to a minimum.

4.d.(4). Pipe for culverts and storm drains may be of concrete, clay, corrugated steel, corrugated aluminum alloy, PVC, or PE. [Edit if metal piping is inappropriate for soil conditions.]

4.e. Gas Distribution System. [Insert " ... (DELETED)" if not applicable and delete remainder of text in sub-paragraphs.] [Coordinate with the installation to determine the responsible agency for installation of exterior gas lines, meters, regulators, hot taps, valves, etc. The design agent shall then add a sentence to this paragraph to inform the contractor of his or her responsibility.] Provide a gas distribution system, connected to existing systems and designed in accordance with local codes, utility company requirements, or installation regulations, whichever is more stringent. Gas distribution systems shall comply with the requirements of ASME B31.8. Connection to existing gas distribution system shall be made at the location shown on the enclosed RFP drawings. When connecting to existing steel piping system, provision shall be made to ensure that the integrity of the cathodic protection is not compromised. Shutoff valves shall be provided on the exterior of each building. A gas regulator and provision for future installation of an individual gas meter to monitor fuel use shall be provided for each housing unit or building structure. The building service entrance shall be installed at a height sufficient to allow for future installation of the gas meter. Existing lines that are to be abandoned shall be either removed or physically disconnected from all gas sources and purged. Abandoning existing gas piping shall be done in accordance with ANSI B31.8, Gas Transmission and Distribution Piping Systems. Installation of gas piping will be in accordance with ANSI B31.8 and 49 CFR 192.

4.d.(1). Materials. Materials and appurtenances shall be free of defects and suitable to accomplish the stated objectives of gas distribution systems. Pipe shall be polyethylene or steel as described below.

4.d.(1).(a). Polyethylene pipe shall conform to ASTM D2513, Standard Specification for Thermoplastic Gas Pressure Piping Systems, with fittings complying with either ASTM D2513 or ASTM D2683, Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing. Connections to metal pipe shall comply with ANSI B16.5, Pipe Flanges and Flanged Fittings, or manufacturer's recommended standards.

4.d.(1).(b). Steel pipe shall conform to ASTM A 53, Grade A or B, Type E or S, Schedule 40; or seamless or electric resistance welded, Schedule 40; black, as specified in ASME B31.8. Furnace butt welded pipe may be used in sizes 40 mm [1-1/2 inch] and smaller. Fittings 40 mm [1-1/2 inch] and smaller shall conform to ASME B16.11. Pipe flanges and flanged fittings larger than 40 mm [1-1/2 inch], including bolts, nuts, and bolt patterns shall be in accordance with ASME B16.5, Class 150. Butt weld fittings shall be in accordance with ASME B16.9. Weld neck flanges shall be used.

4.d.(2). Testing. Prove that the entire system of gas mains and service lines is gas-tight by an air test, in accordance with ANSI B31.8. The test shall continue for at least 24 hours between initial and final readings of pressure and temperature.

4.d.(3). Drips. Unless high pressure natural gas is used, drips shall be installed at the low points, immediately following reduction from high pressure to medium pressure (at supply points) and at occasional low points throughout the system to provide for blowing out the lines.

4.d.(4). Valves. Plug valves shall be installed at intersections of mains and other locations so that interruptions to service can be confined to no more than 30 housing units.

4.d.(5). Mains and service lines. Lines shall not be placed under any buildings. Lines shall be placed with a minimum of 0.6 m [2 ft] of earth cover. Protective casings shall be provided to protect lines from superimposed street or heavy traffic loads.

4.f. Fuel Oil Storage and Distribution. [Insert "DELETED" if not applicable and delete remainder of text in all paragraphs.] Fuel oil storage and distribution system shall be installed to supply the fuel oil-fired heating equipment. Provide a complete fuel oil storage and distribution system designed in accordance with local codes, installation requirements, NFPA 30, and NFPA 31, whichever are more stringent.. Tank size shall be determined using the ASHRAE Degree Day Method using the degree days for the coldest 30-day period for the site.

4.f.(1). Tank storage. Each housing unit shall be provided with a separate fuel oil storage tank unless more than one housing unit is served by a single heating system, in which case each heating system shall be provided with a separate fuel oil tank. Fuel oil storage tanks may be located underground or above ground if the stored volume is less than 2006 L [530 GAL]. Storage tanks shall be placed in a location suitable for filling from a curb-side delivery truck. Above ground tanks shall not be installed on the front side of the building, and shall be concealed by a screen wall or by shrubbery. Fuel oil tanks shall be located in accordance with local codes, and shall be installed a minimum of 0.3 m [1 ft] from the edge of the tank shell to the nearest outside wall of any building or basement or from the nearest adjoining property line. Where tanks are located adjacent to exterior walls or other surfaces requiring periodic painting or other maintenance/repair requirements, a minimum clearance of 1m [3ft] from the edge of the tank is preferred. Underground tanks shall be located such that loads supported by building foundations cannot be transferred to the tank. Proposed tank location shall be clearly indicated in the design submittal.

4.f.(1).(a). Underground tanks. Fuel oil storage tanks installed below grade shall be double-walled type constructed using fiberglass or steel, and installed in accordance with the manufacturer's recommendations. The top of the tank shall be at least 0.6 m [2 ft] below finished grade. Fiberglass tanks shall be constructed in accordance with UL 1316. Steel tanks shall be Type II, constructed in accordance with UL 58, with an STI-P3 coating and guarantee except that the cathodic protection system shall be based on protecting 5 percent of the tank's metal surface. Tanks shall be provided with the necessary fill, vent, gauge, hatch, and suction connections.

4.f.(1).(b). Above ground tanks. Above ground tanks shall be limited in size to a maximum of 2006 L [530 GAL]. Tank shall be provided with legs and located on a concrete pad. Tank shall be constructed of steel, primed and painted, and provided with the necessary fill with valved overflow basin, vent, gauge, and suction connections. Tank containment shall comply with applicable NFPA, EPA, and local code requirements.

4.f.(2). Fuel oil piping. Underground fuel oil piping shall be of double-wall construction, installed without traps or sags. Outer, secondary containment pipe shall be non-metallic. Above ground piping shall be single-wall metallic pipe. Gate valves shall not be used in fuel oil piping systems. A replaceable filter shall be provided upstream of the fuel oil pump. Pipe connectors shall be in accordance with UL 567.

4.f.(3). Leak detection system. A continuous surveillance leak detection system suitable for operation in an NFPA 70, Class 1, Division 1, Group D environment shall be provided to monitor the leak containment space between the interior and exterior walls of double-wall pipe and tanks. The system shall detect leakage into the containment space electronically or by monitoring interstitial pressure or liquid level variations. Liquids used in the containment space for steel tanks shall have a corrosion inhibitor. Liquids subject to freezing conditions shall contain an antifreeze solution. The leak detection system shall be compatible with the piping and tank furnished. Instructions and equipment required for calibration of the leak detection system and manufacturer's recommended calibration maintenance schedule shall be provided.

4.f.(4). Special requirements. [Research local requirements for fuel oil systems installation and either add or delete

items from this sub-paragraph.]

4.f.(4).(a). Spill containment fill. Underground tank fill connection shall be provided in a spill container of 11.4 L [3 GAL] capacity minimum. Contained spills shall be drained into the storage tank by means of a quick-acting drain valve.

4.f.(4).(b). Overfill prevention valve. The overfill prevention valve shall be placed within the tank interior and be an integral part of the fill tube. The valve shall be a float actuated shut-off valve. The valve shall be constructed of the same material as the fill tube. The valve shall have two stages of shutoff. In the first stage, the valve shall restrict the flow of fuel oil into the tank to approximately 0.315 L/s [5 gpm] when the liquid level rises above 95 percent of the tank capacity. In the second stage, the valve shall completely stop the flow of fuel oil into the tank when the liquid level rises above 98 percent of the tank capacity.

4.f.(4).(c). Aboveground Tank Screening. Where fuel oil storage tanks are located above grade the design shall include sight screening for the tank to reduce the visual impact of the fuel oil storage tank. Visual screening may be vegetation or fencing to match the privacy fence at the unit patios. [Design District shall ensure that aboveground fuel oil storage tanks, when selected for use, are suitably screened from view. The requirements of this paragraph may be modified to suit local requirements.]

4.g. Liquefied Petroleum (LP) Gas Storage and Distribution. LP gas tanks shall comply with requirements of NFPA 58 and the ASME Code, Section VII, Pressure Vessels. Tanks shall be pad mounted, and shall not be located inside any building. Tanks shall be provided with all required gauges, shut off valves, safety devices, and suction connections. Shut off valves shall be installed at each tank, at the service entry to the building (if not in sight of the tank), and at each heating unit. No shut off valve shall be installed between a safety device and tank. LP gas pressure shall be reduced to a minimum service pressure of 3.5 kPa [½ psi] prior to the building entrance. LP gas pipe connectors shall be in accordance with UL 567.

4.h. Electrical Distribution. Connection to the existing electrical distribution system shall be made at the location shown on the enclosed RFP drawings. [Insert paragraph describing how connection is to be accomplished.]

4.h.(1). System design. Provide new electrical distribution system as necessary and connect to existing system. System shall be a loop-primary radial system. Primary feeder cables shall be copper or aluminum. High voltage conductors shall have protective shielding. High voltage cable shall be buried a minimum of 1.2 m [4 ft] below the finished grade with continuous cable marker tape 0.3 m [1 ft] below grade. Cable markers shall be installed along the length of direct-burial cable runs to identify their routes from the surface. Markers will be provided at changes of direction and at intervals not to exceed 152.4 m [500 ft]. The electrical on-site distribution system shall be designed in compliance with the rules and recommendations of ANSI C2, National Electrical Safety Code, and NFPA 70,and National Electrical Code, whichever is more stringent. Underground direct-burial distribution is required unless otherwise directed.

4.h.(2). Underground splices. Underground connection or splices are prohibited, except in boxes or manholes. Splices shall be in a self-draining, rodent-resistant box with a cover.

4.h.(3). Service laterals. Service laterals shall be underground. The length of secondary distribution service laterals from the transformer secondary to the building service entrances shall be minimized.

4.h.(4). Service entrance. Only one service entrance per building shall be provided. The service entrance conductor shall be buried a minimum of 0.9 m [3 ft] below finished grade with a minimum separation of 0.3 m [1 ft] from telephone or TV cables. System shall be designed such that the fault current available at the service entrance equipment will not exceed 10,000 amps.

4.h.(5). Transformers. Transformers shall be pad-mounted and have two non-fused switches for the loop connection. The high voltage compartment of the transformer shall include a load break switch with fused circuit for the transformer. The transformed secondary voltages shall be 120/240 V, single-phase, three-wire, solid neutral service to housing units. In selecting a transformer, the name plate rating shall not be less than 90 percent of the kilovolt/amperes (kV/A) demand load calculated for the transformer. [Insert transformer sizing and demand

requirements.]

4.h.(6). Street and area lighting. Residential roadway lighting, including collector streets, shall be provided in accordance with the IES Lighting Handbook. Provide lighting at roadway intersections, and at intervals not exceeding 60.9 m [200 ft] between intersections. Area lighting shall be provided at intervals not exceeding 60.9 m [200 ft] along area walkways not otherwise illuminated, common area walks connecting tot lots, and at all steps in area walkways. Area lighting shall be provided in accordance with the IES Lighting Handbook. Luminaries shall be actuated by photoelectric control, one photocell per circuit, and supplied from multiple circuits originating from a pad-mounted transformer.

4.i. Metering. Metering of utilities shall be provided as follows:

4.i.(1). Master meters. Master meters for water, electricity, and gas shall be provided for all new and replacement housing units except where new housing units are metered by an existing meter.

4.i.(2). Individual meter and meter drops. Individual utility meter drops (excluding water), and fuel oil metering points (where applicable) shall be provided for all housing units. Provide sockets for electric watt-hour meters at each housing unit. Provide manual by-pass jumper plates for each socket. Locate utility meter drops and fuel oil metering points in an area readily accessible by service personnel. Meters and meter bases shall be sight screened, and located to provide convenient access while not distracting from building appearance. [Provide individual utility meters when required by local jurisdictions.]

4.i.(3). Gas metering. Provide for future individual housing unit metering devices. Comply with local requirements. Meter and regulator location shall be sight screened, and located to provide convenient access while not distracting from building appearance.

4.i.(4). Group water meter requirements. Group water meters are required for new and replacement housing projects where total daily water demand exceeds 94.6 $m^3$ [25,000 gal]. Meters shall be equipped with electronic or radio frequency transmitters for remote monitoring. The method of remote monitoring must be coordinated with installation utility systems. The size of the group for metering shall be at least five but no more than 20 single family detached, duplex, or townhouse units. Metering groups for apartment units shall be at least 25, but no more than 50 housing units.

4.j. Telephone. The [Telephone company or Contractor] will furnish and install distribution cables. Conduit required between underground terminal boxes and the buildings shall be provided by the Contractor. Trenching and backfill required to install the telephone company cables shall be included in the construction contract. Contractor provided boxes, conduits, and trenching shall comply with local telephone company criteria and shall be coordinated with the telephone company.

4.k. Television. [Provide commercial cable TV or site distribution system(s) when feasible. Requirements to be edited in accordance with local conditions and availability.] An antenna system or connection to a TV distribution system shall be provided for each housing unit. The TV system shall provide for UHF and VHF reception for color TV. The antenna system may be either a common antenna serving the entire project (mast or dish), an attic antenna system for each separate building, or attic antenna for each housing unit. The Contractor shall provide all trenching, conduit, boxes, and backfilling required to install commercial and/or Contractor provided distribution systems.

4.l. Cathodic Protection. Cathodic Protection (CP) is mandatory on buried ferrous metallic structures as described below:

4.l.(1). Department of Transportation guidance as stated in 49 CFR, Part 192, requires that all metallic natural gas piping be coated and cathodically protected regardless of the soil resistivity.

4.l.(2). Corrosion control is mandated for all metallic underground storage tanks storing petroleum or hazardous substance by 40 CFR, Part 280 and AR 200-1 and on hazardous liquid pipelines (e.g., liquid fuel) by 49 CFR, Part 195.

4.l.(3). CP systems must be designed to provide protective potential to meet the requirements of the National Association of Corrosion Engineers (NACE) Standard RP-0169, Control of External Corrosion on Underground or Submerged Metallic Piping Systems, or NACE Standard RP-0185, Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems, as appropriate.

4.l.(4). New or supplemental CP systems shall be compatible with existing CP systems and other adjacent structures or components. New systems should be compatible with existing systems to allow ease of repair and maintenance.

4.l.(5). When plastic pipe is used to extend a steel gas distribution main, an insulated No. 8 AWG copper wire shall be exothermically welded to the existing steel main and run the length of the new plastic main. This wire can be used as a locator tracer wire and to maintain continuity to any future steel gas main extension.

4.l.(6). CP and protective coatings shall be provided for the following buried and submerged ferrous metallic structures regardless of soil or water resistivity:

4.l.(6).(a). Natural gas and propane piping.

4.l.(6).(b). Liquid fuel piping.

4.l.(6).(c). Underground fuel storage tanks except for those coated in accordance with UL 1746.

4.l.(6).(d). Fire protection piping.

4.l.(6).(e). Ductile or cast iron pressurized piping under floor (slab on grade) in soil.

4.l.(6).(f). Underground heat distribution and chilled water piping in ferrous metallic conduit.

4.l.(6).(g). Other structures with hazardous products as identified by the installation.

4.l.(7). Cast iron pipe shall be treated as follows:

4.l.(7).(a). For soil resistivity below 10,000 Ohm-cm at pipeline installation depth, provide CP, bonded joints, and protective coatings.

4.l.(7).(b). For soil resistivity between 10,000 and 30,000 Ohm-cm at pipeline installation depth, provide bonded joints only.

4.l.(8). Copper water service lines will be dielectrically isolated from ferrous pipe. Dielectric isolation shall conform with NACE RP-0286.

4.l.(9). For ductile iron piping systems (except for ductile iron piping under floor in soil) conduct an analysis to determine if CP and/or bonded or unbonded coatings are required. Unbonded coatings are defined in ANSI/AWWA C105/A21.5.

4.l.(10). Conduct an economic analysis to determine if CP and protective coatings should be provided for gravity sewer lines and the following structures in soil resistivity conditions above 10,000 Ohm-cm:

4.l.(10).(a). Potable water lines.

4.l.(10).(b). Concentric neutral cable.

4.l.(10).(c). Other buried and submerged ferrous metallic structures not covered above.

4.l.(11). Ferrous metallic piping passing through concrete shall not be in contact with the concrete.

**5. UNIT DESIGN - ARCHITECTURE.**

5.a. Unit Design. Unit design shall be within the net areas authorized for the various type of housing units specified. Public Law 97-214, Title 10 USC, Section 2826, establishes net area limitations for military family housing. The law permits a 5 percent maximum increase in these limitations if such modifications will permit a turnkey offer of "off-the-shelf" designs currently being constructed in the commercial marketplace. Statutory floor area limitations for housing units are as listed in Table 5-1 with allowable area variations.

**TABLE 5-1 - SIZE OF HOUSING UNITS BY PAY GRADE**

| Pay Grade | Number of Bedrooms | Net Floor Area | | | | | |
|---|---|---|---|---|---|---|---|
| | | -2% Min. (DA) | | Basic (Statutory Limit) | | +5% Max. (Turnkey) | |
| | | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ |
| O-7 & above (GO) | 4 | 191 | 2,058 | 195 | 2,100 | 205 | 2,205 |
| O-6 (SO) | 4 | 154 | 1,660 | 158 | 1,700 | 166 | 1,785 |
| O-4/5 (FGO) | 4 | 141 | 1,519 | 144 | 1,550 | 151 | 1,628 |
| | 3 | 128 | 1,372 | 130 | 1,400 | 137 | 1,470 |
| O-1/3 (CGO) W-1/4 E-7/9 (SNCO) | 5 | 141 | 1,519 | 144 | 1,550 | 151 | 1,628 |
| | 4 | 132 | 1,421 | 135 | 1,450 | 142 | 1,523 |
| | 3 | 123 | 1,323 | 125 | 1,350 | 132 | 1,419 |
| | 2 | 87 | 931 | 88 | 950 | 92 | 998 |
| E-1/6 (JNCO) | 5 | 141 | 1,519 | 144 | 1,550 | 151 | 1,628 |
| | 4 | 123 | 1,323 | 125 | 1,350 | 132 | 1,419 |
| | 3 | 109 | 1,176 | 112 | 1,200 | 117 | 1,260 |
| | 2 | 87 | 931 | 88 | 950 | 92 | 998 |

5.a.(1). Net area definition. Net area is defined as the space inside the exterior and party walls. Net area excludes:

5.a.(1).(a). Exterior and party walls.

5.a.(1).(b). Half thickness of interior walls adjacent to excluded areas.

5.a.(1).(c). Utility and laundry rooms.

5.a.(1).(d). Interior and exterior bulk storage.

5.a.(1).(e). Washer and dryer closet (not to exceed 2.8 $m^2$ [30 $ft^2$]).

5.a.(1).(f). Furnace, domestic water heater, and solar equipment spaces.

5.a.(1).(g). Stairwells.

5.a.(1).(h). Landings.

5.a.(1).(i). Walls and interior spaces specifically designed for passive solar systems (other than required habitable areas).

5.a.(1).(j). Weather vestibules (not to exceed 1.5 $m^2$ [16 $ft^2$]) sheltering the main entry.

5.a.(1).(k). Unfinished attic and basement space.

5.a.(1).(l). Patios or balconies and terraces.

5.a.(1).(m). Carports and garages.

5.a.(1).(n). Increases required to meet accessibility standards.

5.a.(1).(o). Open or screened porches without heating, air conditioning, or interior-type finishes. In localities subject to adverse weather conditions, such as wind-driven mist or noxious atmosphere, or both, open porches may be enclosed with appropriate fenestration or screening, or both, and not considered to increase the net area of the housing units, provided that air conditioning or heating, or both, is not added and the basic character of the enclosed area is still that of a porch.

5.a.(2). Allowable net area increases. [Note: This additional square footage will be delineated for each specific project in the project DD Form 1391 document. Identify applicable pay grade(s), number of bedrooms, and number of housing units in each special command position.]

5.a.(2).(a). Accessible housing units shall be designed in such a way that they may be easily and readily modified to accommodate physically challenged occupants, if necessary, at time of occupancy. This means required access clearances, room sizes, bathroom layout, kitchen layout, doors and hardware, grab bars, plumbing hookups, light switches and outlets, controls, and warning devices must meet requirements at time of construction. Readily modifiable means that requirements for adjustable height cabinets and work surfaces, plumbing fixtures, and the warning devices for the hearing and visually impaired can be made either at time of construction or at time of occupancy.

5.a.(2).(b). Net floor areas may be increased by a maximum of 10 percent above the basic for officers holding special command positions as designated by the Secretary of Defense, commanding officers of military installations, and senior noncommissioned officers of military installations. The increase allowed for the above designations is the maximum allowed regardless of whether the housing units are procured by conventional design-build or turnkey methods. [Insert "...(DELETED)" and delete remainder of text if not applicable to the project.]

5.a.(2).(c). The applicable maximum net floor area may be increased by 27.87 $m^2$ [300 $ft^2$] of indoor activity room for a housing unit in a harsh climate location. Hash climates are defined as being in weather regions 1-3, as shown in Table 7-1. [Insert "...(DELETED)" and delete this paragraph if not applicable to the project.]

5.b. Functionality. Rooms shall be sized and arranged for efficient use, good circulation, and furniture placement. The distribution of space for food preparation living and dining, sleeping, bathing, halls, closets, and services should be balanced and should enhance the intended functions.

5.b.(1). Habitable rooms shall not be used as halls for entry into a housing unit or for primary circulation within a housing unit.

5.b.(2). Provide convenient access between garage and service area, and between kitchen and service area.

5.b.(3). Do not use a sliding glass door as a primary housing unit access.

5.c. Indoor and Outdoor Integration. Emphasize factors that enhance indoor and outdoor living. Consider size, layout and location of patios, balconies and yards, and features that encourage family use of outdoor areas.

5.d. Fire Protection and Safety. Housing units will comply with the applicable National Fire Codes, including NFPA 101, Life Safety Code. Construction features will be provided in accordance with the Uniform Building Code (UBC). [For housing units located off-post and for privatized housing, the construction features may comply with model codes in lieu of UBC, if model codes require compliance with a nationally recognized building code.]

5.d.(1). Fire resistance of party walls and roof material. Party walls shall extend without openings, from ground to the underside of roof sheathing. Provide firestops at floor, and ceiling or roof line. Provide Class A (ASTM E108, Standard Methods of Fire Tests of Roof Coverings) roof covering material throughout. Party walls (walls separating housing units) shall have the minimum fire-resistance ratings shown below:

5.d.(1).(a). Duplexes, one hour.

5.d.(1).(b). Townhouses, two hour.

5.d.(1).(c). Apartments, one hour with approved sprinkler system.

5.d.(2). Party floors. Party floors shall have a topping slab of 50 mm [1-1/2 inch] lightweight concrete, or similar material. Party floors shall have a minimum one-hour fire-resistance rating, in accordance with ASTM E119.

5.d.(3). Heater rooms. Rooms equipped with fuel-fired equipment such as boiler rooms, furnace rooms, and rooms with fuel-fired water heaters, which serve more than one housing unit shall be separated by one-hour fire-rated construction. Direct access to these rooms from the exterior is preferred. Rooms with fuel-fired equipment that serve only one housing unit shall be lined with 13 mm [1/2-inch] gypsum board or equivalent noncombustible material.

5.d.(4). Alarm systems. When a general building alarm system is required by NFPA 101, such as those required for housing units four stories or higher, the required systems shall transmit alarms to the installation fire department. Exceptions are made for housing units not located on military installations and for housing units located on installations without a installation-wide or central fire reporting system. Smoke detectors which are located within the housing unit and which sound an alarm only within the housing unit are not required to be transmitted.

5.d.(5). Sprinkler systems. Apartment units shall be fully sprinkled. Sprinkler systems for garden apartments (one through four floors) will comply with NFPA 13R. Sprinkler systems for apartment buildings of over four floors will comply with NFPA 13.

5.e. Sound Attenuation.

5.e.(1). Testing. Certified proof-of-performance field tests will be conducted to demonstrate that the floor and wall systems as constructed provide the required sound isolation. Tests for air-borne sound shall be made in compliance with ASTM E336. Tests for impact sound shall be made in compliance with ASTM E1007. Testing of 10 percent (minimum) of each type of floor and wall system is required. Location of test sites will be chosen at random by the Contracting Officer.

5.e.(1).(a). Any wall or floor system found to be inadequate shall have the deficiencies corrected and the additional qualifying tests conducted at the Contractor's expense. Testing at the Contractor's expense of greater than 10 percent of each system may be required if the Contracting Officer determines that the quality of construction requires this additional testing.

5.e.(1).(b). Walls and floor ceiling systems shall be designed to meet or exceed the requirements stated below. In cases where the field tested performance of the systems does not meet the designed performance, the maximum acceptable difference between field tests and sound transmission ratings shall be 2 decibels (dB) for airborne sound ratings and 5 dB for impact sound ratings.

5.e.(2). Party walls and floor and ceiling construction between housing units (party floors) shall be designed to provide the minimum airborne sound transmission ratings and impact isolation ratings stated in Table 5-2.

**TABLE 5-2 - SOUND TRANSMISSION STANDARDS FOR PARTY WALLS AND FLOOR/CEILING CONSTRUCTION**

| Area | FSTC[1] | FIIC[2] |
|---|---|---|
| Party Walls (Unit Separation) | 52 | - |
| Primary Habitable Areas (Living, Dining, Family Room, Bedrooms, Circulation) | 52 | 65 |
| Habitable Wet Areas (Kitchen, Bath, Utility, Laundry, Equipment) | 52 | 57 |
| Habitable Areas Over Garages | 52 | - |

Note[1]: Field Sound Transmission Class. See ASTM E336.

Note[2]: Field Impact Isolation Class. See ASTM E1007.

5.e.(3). Floor construction. Floor construction between occupancies shall be designed to provide the minimum FSTC and FIIC ratings stated in Table 5-2. Materials used to obtain the required sound attenuation for the floor construction shall not be liquid-soluble or softened by moisture. Sound insulation shall have a flame-spread rating of 25 or less and a smoke development rating of 50 or less when tested in accordance with ASTM E84.

5.e.(4). Plumbing and HVAC equipment. Design of plumbing and Heating, Ventilating, Air-Conditioning (HVAC), and dehumidifying equipment shall include design provisions such as location, enclosure and acoustical treatment, to minimize transmission of noise generated by equipment within each housing unit and to eliminate transmission of noise to other housing units.

5.f. Dimensions and Areas. Minimum areas and dimensions for interior spaces are shown in Table 5-3. Minimum areas and dimensions for exterior spaces are shown in Table 5-4.

**TABLE 5-3 - MINIMUM AREAS AND DIMENSIONS - INTERIOR SPACES**

| Space | Area | | Length | | Width/Depth | | Height[1] |
|---|---|---|---|---|---|---|---|
| | $m^2$ | $ft^2$ | mm | ft-in | mm | ft-in | mm |
| Living[2] | 14.0 | 150 | 3550 | 11-8 | 3550 | 11-8 | 2300 |
| Dining (2/3 BR)[2] | 8.4 | 90 | 2900 | 9-6 | 2900 | 9-6 | 2300 |
| Dining (4/5 BR)[2] | 10.2 | 110 | 3200 | 10-6 | 3200 | 10-6 | 2300 |
| Dining (GO)[2] | 13.4 | 144 | 3650 | 12-0 | 3650 | 12-0 | 2300 |
| Family Room[2] | 8.4 | 90 | 2900 | 9-6 | 2900 | 9-6 | 2300 |
| Kitchen[3,6] | 6.0 | 64 | 2450 | 8-0 | 2450 | 8-0 | 2300 |
| Eating in Kit.[4] | 6.7 | 72 | 2600 | 8-6 | 2600 | 8-6 | 2300 |
| Refrigerator & Freezer | 0.5 | 6 | 900 | 3-0 | 600 | 2-0 | 1800 |

**TABLE 5-3 - MINIMUM AREAS AND DIMENSIONS - INTERIOR SPACES**

| Space | Area | | Length | | Width/Depth | | Height[1] |
|---|---|---|---|---|---|---|---|
| | $m^2$ | $ft^2$ | mm | ft-in | mm | ft-in | mm |
| Washer/Dryer[5] | 1.6 | 54 | 1800 | 6-0 | 900 | 3-0 | 2100 |
| BR #1 | 14.0 | 150 | 3550 | 11-8 | 3550 | 11-8 | 2300 |
| BR #2 | 11.1 | 120 | 3000 | 10-0 | 3000 | 10-0 | 2300 |
| BR #3 | 9.0 | 100 | 3000 | 10-0 | 3000 | 10-0 | 2300 |
| BR #4/5 | 8.4 | 90 | 2900 | 9-6 | 2900 | 9-6 | 2300 |
| Half Bath[6] | - | - | - | - | 900 | 3-0 | 2300 |
| Full Bath[6] | - | - | - | - | 1500 | 5-0 | 2300 |
| Vestibule | 1.2 | 13 | 1000 | 3-3 | 1200 | 4-0 | 2300 |
| Hall & Stairway[7] | - | - | - | - | 1000 | 3-3 | 2300 |

Note[1]: Ceiling heights in habitable rooms shall be a minimum of 2300 mm [7 ft-6 inches]. Ceiling heights can be reduced in parts of these rooms to 2100 mm [7 ft] to accommodate ducts.
Note[2]: Room dimensions are exclusive of circulation. Circulation paths along one side of a room are permitted but add 1000 mm [3 ft-3 inches] to the minimum dimension.
Note[3]: A minimum of 1200 mm [4 ft] must be maintained in front of and between cabinets.
Note[4]: Minimum area and dimensions are measured from face of cabinets to walls.
Note[5]: Minimum area and dimensions are indicated for a washer and dryer closet. This area may also be provided in a utility room. When so provided, area and dimensions are exclusive of circulation.
Note[6]: Accessible units must conform to UFAS. UFAS requires greater minimum dimensions.
Note[7]: Clear width is measured between railings.

**TABLE 5-4 - MINIMUM AREAS AND DIMENSIONS - EXTERIOR SPACES**

| Spaces | Area | | Length | | Width/Depth | | Height[1] |
|---|---|---|---|---|---|---|---|
| | $m^2$ | $ft^2$ | mm | ft-in | mm | ft-in | mm |
| Garage | 21.6 | 240 | 3650 | 12-0 | 6100 | 20-0 | 2300 |
| Balconies | 6.7 | 72 | 1800 | 6-0 | 1800 | 6-0 | 2300 |
| Patio - 2 BR | 11.2 | 120 | - | - | 2400 | 8-0 | 2400 |
| Patio - 3 BR | 13.6 | 144 | - | - | 3000 | 10-0 | 2400 |
| Patio - 4 BR | 17.0 | 180 | - | - | 3000 | 10-0 | 2400 |
| Patio - 5 BR | 20.4 | 216 | - | - | 3700 | 12-0 | 2400 |

Note[1]: Ceiling heights apply when patios and balconies are covered.

5.f.(1). Minimum area requirements for kitchen cabinets, counters, and pantries are shown in Table 5-5. Flat area is shown for countertops and drawers. Combined shelf area is shown for pantry and base, wall and wall cabinets.

**TABLE 5-5 - KITCHEN CABINET, COUNTER, & PANTRY AREA**

| Type of Housing Unit | Wall | | Base | | Drawer | | Counter | | Pantry | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $m^2$ | $ft_2$ | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ |
| GO/SO | 3.4 | 36 | 4.4 | 46 | 2.1 | 22 | 1.9 | 20 | 1.9 | 20 |
| Others 4/5 BR | 2.8 | 30 | 3.8 | 40 | 1.7 | 18 | 1.5 | 16 | 1.5 | 16 |
| Others 2/3 BR | 2.3 | 24 | 3.0 | 32 | 1.3 | 14 | 1.1 | 12 | - | - |

5.f.(2). Minimum closet width requirements are stated in Table 5-6.

**TABLE 5-6 - MINIMUM CLOSET WIDTHS[1]**

| Type of Unit | EM | | FGO/SO | | GO | |
|---|---|---|---|---|---|---|
| | Mm | ft | mm | Ft | mm | ft |
| Coat/ Entry Hall | 900 | 3 | 1200 | 4 | 1500 | 5 |
| Master[2] BR #1 | 1800 | 6 | 1800 | 6 | 3000 | 10 |
| BR #2 | 1200 | 4 | 1200 | 4 | 1800 | 6 |
| BR #3 | 1200 | 4 | 1200 | 4 | 1800 | 6 |
| BR #4/5 | 1200 | 4 | 1200 | 4 | 1200 | 4 |

**TABLE 5-6 - MINIMUM CLOSET WIDTHS[1]**

| Type of Unit | EM | | FGO/SO | | GO | |
|---|---|---|---|---|---|---|
| | Mm | ft | mm | Ft | mm | ft |
| Broom | 900 | 3 | 900 | 3 | 900 | 3 |
| Linen[3] | 600 | 2 | 900 | 3 | 1200 | 4 |

Note[1]: Minimum inside clear depth for standard/broom closets shall be 600 mm [2 ft].
Note[2]: Walk-in closet is preferred.
Note[3]: Minimum clear inside depth for linen closets shall be 430 mm [1 ft-6 inches].

5.f.(3). Minimum requirements for interior, exterior, and combined bulk storage are shown in Table 5-7.

**TABLE 5-7 - MINIMUM INTERIOR, EXTERIOR, & COMBINED BULK STORAGE[1]**

| Type of Unit | Type of Storage | EM/CGO | | FGO/SO | | GO | |
|---|---|---|---|---|---|---|---|
| | | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ | $m^2$ | $ft^2$ |
| 2 BR | Int. | 2.3 | 24 | - | - | - | - |
| | Ext. | 3.0 | 32 | - | - | - | - |
| | Comb. | 6.5 | 70 | - | - | - | - |
| 3 BR | Int. | 3.0 | 32 | 3.7 | 40 | - | - |
| | Ext. | 3.7 | 40 | 4.5 | 48 | - | - |
| | Comb. | 7.9 | 85 | 10.3 | 111 | - | - |
| 4 BR | Int. | 3.7 | 40 | 4.5 | 44 | 5.0 | 54 |
| | Ext. | 4.5 | 48 | 5.0 | 54 | 5.6 | 60 |
| | Comb. | 9.3 | 100 | 11.2 | 120 | 18.6 | 200 |
| 5 BR | Int. | 4.5 | 48 | - | - | - | - |
| | Ext. | 5.0 | 54 | - | - | - | - |
| | Comb | 10.2 | 110 | - | - | - | - |

Example[1]: If interior bulk storage is 2.3 $m^2$, then exterior bulk storage must be 4.2 $m^2$ to obtain the combined bulk storage requirement of 6.5 $m^2$.

5.g. Major Zones. Living and Dining, Kitchen, Family Room, and Bedrooms.

5.g.(1). Living and dining. The living room should have direct access to the front entrance foyer and to the dining area without passing through another room. When circulation is required along the perimeter of the space or between areas in open plans, minimum circulation space of 1000 mm [3 ft-3 inches] shall be added to the required minimum room dimension.

5.g.(1).(a). The dining area may be an extension of, or an "L" off the living room.

5.g.(1).(b). The dining area shall be directly accessible from the kitchen without passing through another room.

5.g.(1).(c). For Senior Officer family units, provide separate dining rooms or areas to accommodate furniture and seating for not less than 10 persons.

5.g.(2). Kitchen and auxiliary dining area.

5.g.(2).(a). The kitchen shall provide an efficient work triangle. A base cabinet, minimum 380 mm [15 inches] wide, shall be provided on the handle side of the refrigerator. The range shall not be located adjacent to the refrigerator, in a corner, or adjacent to a passageway. The dishwasher shall be installed adjacent to the kitchen sink. Provide a backsplash behind the range, extending to the underside of the range hood, finished to match the countertop or range and the range hood. Space for a tenant-owned upright freezer shall be provided adjacent to the kitchen or in areas such as the utility room or garage. Space for a tenant-owned microwave oven shall be provided in the kitchen.

5.g.(2).(b). Provide auxiliary dining areas in the form of table space in the kitchen or in a family room adjacent to, or as an extension of, the kitchen. The auxiliary dining area shall not be located in the living or dining rooms.

5.g.(2).(c). In the kitchen, shoe molding (1/4 round) is required at all base cabinets where they meet the floor surface.

5.g.(3). Family room. Provide a separate family room, adjacent to and contiguous with the kitchen, for all three-, four, and five-bedroom units.

5.g.(4) Bedrooms. Bedrooms shall be designed to accommodate king-size beds in master bedrooms and twin beds in the other bedrooms. Window, door, and closet placement should enhance furnishability. Each bedroom shall be accessible without passing through another bedroom.

5.h. Minor Zones. Bathrooms, Laundry, Closets, and Bulk Storage.

5.h.(1). Bathrooms. Emphasis shall be placed on size, furnishings, layout, and privacy. Direct access to a bathroom from the master bedroom is required for three-, four-, and five-bedroom units. Compartmented bath design, for family and guest use, is encouraged. Determine the number of bathrooms based on Table 5-8.

**TABLE 5-8 - BATHROOM REQUIREMENTS**

| Number of Bedrooms per Floor | Number of Bathrooms Per Floor |
|---|---|
| None | .5 |
| 1 - 2 | 1 |
| 3 - 5 | 2 |

Note: General Officer (GO) units shall have three full bathrooms, with one on the first floor configured for accessibility.

5.h.(1).(a). A full bath shall contain a water closet, lavatory, and either a tub with shower assembly or a shower stall. One full bath in each housing unit shall include a tub with shower assembly and shall be directly accessible from the bedroom hall without passing through another room. Showers, and tubs with shower assemblies, shall include tempered glass or plastic enclosures and doors. A half bath contains a lavatory and a water closet.

5.h.(1).(b). Provide lavatories mounted in 610-mm [2-ft] wide (minimum) countertops, with vanity bases. Countertops shall be high pressure laminated plastic, ceramic tile, marble, or homogeneous, non-porous, solid surface type materials, with minimum 100 mm [4 inches] high back splashes.

5.h.(1).(c). Bathroom accessories may be surface mounted or recessed, of non-corrodible metal or ceramic tile, and shall include a toilet paper holder, soap dish (at sink and at tub/shower), toothbrush and tumbler holder, and grab bar at tub or shower stall, bathrobe hook, and towel bars totaling not less than 1100 mm [42 inches] for a full bath and

not less than 750 mm [30 inches] for a half bath.

5.h.(1).(d). A recessed medicine cabinet shall be provided in each bathroom. Cabinets shall be corrosion-resistant with plate glass mirrors, sliding or hinged door type. Do not place recessed medicine cabinets in party walls.

5.h.(1).(e). Tubs and showers shall not be placed under windows.

5.h.(1).(f). Exhaust shall be provided in all baths, shall be ducted directly to the exterior of the building, and shall be a part of an engineered ventilation system (See paragraph 10).

5.h.(2). Laundry. Washer and dryer space may be provided in an enclosed recess off the hall in two-bedroom units. Three-bedroom and larger units shall have a separate utility room.

5.h.(2).(a). The space provided shall have doors that provide full access when open. Two full-length shelves, 250 mm [10 inches] minimum nominal depth, are required above the washer and dryer.

5.h.(2).(b). Minimum net clear door width to washer and dryer space when open is 1600 mm [5 ft-4 inches] for an enclosed recess and 800 mm [2 ft-8 inches] if located within a utility room.

5.h.(3). Closets. Closets shall provide the minimum widths indicated in Table 5-6. A broom closet shall be provided convenient to the kitchen, and a coat closet shall be located convenient to the housing unit entrance.

5.h.(3).(a). Closet shelving. Closets (except linen closets) shall be equipped with a 305 mm [12 inches] deep shelf and a clothes hanger rod. Linen closets shall be provided with at least four full-depth shelves. Closet shelving and rods in excess of 1200 mm [4 ft] shall have center supports. Shelves and supports shall be capable of carrying 52 kg/m [35 lbs/ft]. Closet shelving shall be minimum 19 mm [3/4 inch] thick solid wood, plywood, or high density particle board. [Factory Finished welded wire shelving meeting the capacity requirements is also permitted. Intermediate supports must be anchored to studs.]

5.h.(3).(b). Closet doors. Closet doors should be located to permit placement of furniture in the corners of the rooms by providing a 460-mm [18-inch] return adjacent to a furnishable wall. Closets 1800 mm [6 ft] or more in width shall have sliding doors, maximum 2000 mm [6 ft-8 inches] high. Wall closet width shall not extend beyond either door jamb more than 510 mm [20 inches]. Wardrobe closet doors (sliding and bi-fold) shall be provided with both top and bottom door tracks.

5.h.(4). Bulk storage. Provide each housing unit with interior and exterior bulk storage space meeting the minimum requirements of Table 5-7. Provide interior storage in a separate room or included as an extension of the utility room when one is provided. Provide exterior storage in a garage, a separate exterior enclosure, or within the housing unit with access from the exterior.

5.h.(4).(a). Apartment buildings shall provide an enclosed room on the ground floor level for the common storage of bicycles, prams, etc. This storage space (minimum of 1.7 $m^2$ [18 $ft^2$] per housing unit) is in addition to the required minimum interior and exterior storage indicated in Table 5-7 for the individual housing units. Exterior storage space shall be lockable.

5.h.(4).(b). Bulk storage space should be at least 1200 mm [4 ft] in depth and a minimum clear height of 2000 mm [6 ft-6 inches], except that space under stairs may be counted at 1/2 area if the space is 1200 mm [4 ft] or more in height.

5.h.(4).(c). Provide a minimum of three nominally 305 mm [12 inches] deep shelves with a combined length of 7300 mm [24 ft] within each bulk storage room.

5.h.(4).(d). Common walls and ceilings between adjacent storage areas shall be finished on both sides.

5.i. Interior Finishes

5.i.(1). Walls and ceilings. Provide 13 mm [1/2-inch] gypsum wallboard, taped and smooth finished. Water-resistant wallboard shall be used in wet areas such as bath, powder, and laundry rooms. Cementitious backer board shall be used for ceramic tile applications. Textured ceiling finish may be provided in areas other than kitchen, laundry, or bathrooms. Interior finish shall have a flame-spread rating of 25 or less and a smoke-developed rating of 50 or less when tested in accordance with ASTM E84.

5.i.(2). Kitchen and eating area walls and ceiling. Combined kitchen and eating rooms shall have the same type of wall and ceiling finishes.

5.i.(3). Flooring and stairs, base, and carpet. Kitchen, laundry, and utility flooring shall be sheet, seamless vinyl with wood base. Bedroom, hall, and living-dining area flooring shall be carpet or vinyl composition tile with wood base. Bathrooms shall be of ceramic tile flooring with ceramic tile base or seamless sheet vinyl with premolded vinyl base. Interior stairs shall be hardwood with clear finish, or softwood with carpet. Additional consideration will be given to designs which incorporate ceramic tile bathroom floors and hardwood stairs with a clear finish. This material identification is not justification to exceed the mandatory price limitation set forth in this solicitation.

5.i.(3).(a). Vinyl composition floor tile shall conform to ASTM F1006, Standard Specification for Vinyl Composition Floor Tile, and have a minimum thickness of 2.381 mm [3/32-inch].

5.i.(3).(b). Sheet vinyl shall conform to ASTM F1303, Standard Specification for Sheet Vinyl Floor Covering with Backing, Type II, Grade 2. Flooring shall be installed as a monolithic material with seams welded or bonded for a seamless installation. No seams shall be permitted in spaces less than 12 feet in width.

5.i.(3).(c). Ceramic tile shall conform to ANSI 137.1, moderate or heavy grade.

5.i.(3).(d). Carpet shall be installed in the stretch method over carpet pad utilizing tackless strips in accordance with CRI-104. Carpet shall meet the following criteria:

5.i.(3).(d).1/. Properties: Tufted construction, 100 percent branded continuous filament nylon or polyethylene theraphthalate, soil hiding, multi-colored, loop or cut pile, 1/8 guage, yarn weight 800 grams per square meter [28 ounces per square yard], total weight grams per square meter [60 ounces per square yard], 5000 minimum density, synthetic primary and secondary backing.

5.i.(3).(d).2/. Tuft bind for tufted carpet shall meet a minimum of 44 N (10 pounds) when tested in accordance with ASTM D1335, 1967; R-1972

5.i.(3).(d).3/. Carpet shall meet requirements of 16 CFR 1630 and have a minimum average critical flux of .45 watts per square centimeter when tested in accordance with ASTM E648.

5.i.(3).(d).4/. Static electricity build-up shall be permanently less than 3.5 KV at 21 degrees C [70 degrees F] with 20 percent relative humidity as determined by American Association of Textile Chemists and Colorists (AATCC) Test Method 134, Electrostatic Propensity of Carpets.

5.i.(3).(d).5/. Ten-year warranty from the carpet manufacturer against edge ravel, delamination, and tuft bind.

5.i.(3).(d).6/. Carpet pad shall be 1/2 inch bonded urethane, minimum 6-pound density. Urethane pad will conform to ASTM.D.3676.

5.i.(3).(d).7/. Carpet edging shall be 38 mm [1-1/2-inch] minimum width floor flange and minimum 15.5 mm [5/8-inch] wide face.

5.i.(3).(d).8/. Tackless strip for stretch-in installation over carpet pad shall be exterior grade Douglas Fir plywood, with minimum dimensions of 29 mm by 7 mm [1-1/8-inch wide] suitable for the cushion thickness specified. Tackless strips with two or three rows of staggered pins shall be used. For areas over 6100 mm [20 ft] long, tackless strip with three rows of pins shall be used. Pins of the proper length shall be provided to penetrate through carpet backing, but shall not be a safety hazard.

5.i.(3).(d).9/. Carpet containing recovered material is designated in 40 CFR 247.12 as an affirmative procurement item. Products containing recovered material will be provided when price, performance, and availability meet project requirements. Various nylon and polyethylene terephthalate carpet offer the opportunity to meet this requirement.

5.i.(4). Painting. Primers, paints, and stains shall meet or exceed the requirements of Corps of Engineers Guide Specification 09900, Painting, General, provided in the Technical Specifications. (USACE activity should edit current edition of CEGS 09900 to list only the applicable finish systems). Finishes shall be lead free. All interior surfaces, except factory prefinished material, shall be painted a minimum of one prime coat and one finish coat. Walls and ceilings in kitchen, baths, laundry, utility rooms, and all painted trim shall be painted with semi-gloss enamel. Colors shall be submitted by the Contractor and approved by the Contracting Officer. Blown-on acoustical finish is prohibited.

5.j. Garages. Provide a single car garage for each housing unit. If trash or bulk storage areas are included in the garage or carport, such areas are in addition to the required car storage area. Refer to Table 5-4 for minimum dimensions. Set the garage slab elevation a minimum of 100 mm [4 inches] below the level of the housing unit floor and the floor of the adjoining exterior storage. Slope slabs to drain out the garage door. Garage doors shall have hardware that can be opened and locked from inside and outside of the garage.

5.k. Roofing and Drainage. Minimum slopes for roofs shall be as shown in Table 5-9.

**TABLE 5-9 – ROOF SLOPES**

| Roof Types | Rise | Run |
|---|---|---|
| Shingle/Tile | 1 | 4 |
| Metal | 1 | 6 |

5.k.(1). Roof water. Gutters and downspouts shall be provided for all roof areas. Downspouts draining onto a lower roof shall have metal or plastic splash deflectors. Concrete splash blocks shall be provided under downspouts if not connected to the storm drainage system.

5.k.(2). Roof surface. Wood shake or shingle roofs are prohibited. Roofing shall be limited to the following:

5.k.(2).(a). Minimum of 102 kg [225 lb] Class A wind-resistant fiberglass shingles conforming to ASTM D3018, Specification for Class A Asphalt Shingles Surfaced With Mineral Granules.

5.k.(2).(b). Minimum of 245 kg [540 lb], standing or flat seam, metal roofing with 0.7 mm [0.027 inch] thick zinc-copper-titanium alloy factory finish.

5.k.(2).(c). Clay, concrete, metal, or fiberglass tile. [Design District shall add information when allowed for use.]

5.k.(2).(d). Aluminum standing seam roofing 0.8 mm [0.032 inch] thick.

5.k.(2).(e). Copper [Design District shall add minimum thickness for roofing.]

5.k.(3). Common roofs. Parapet walls are prohibited.

5.l. Exterior Finishes. Emphasis shall be placed on low maintenance and durability for exterior finish materials. Materials shall be residential in size, scale, and texture. Exterior finish materials for exterior bulk storage buildings and garages will match the primary dwelling unit. The following siding materials may be used, but are listed in declining order of preference: [Edit order of preference to reflect installation preferences.]

5.l.(1). Brick. Brick shall conform to ASTM C216, Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale). Provide brick cap and flashing for all offset brick veneer. For grade beam design, the brick

shall run a minimum of one course below the finished floor and shall be flashed at that level.

5.I.(2). Stucco. Portland cement plaster or synthetic stucco shall have integral color. Stucco total surface area shall be divided into panels with control joints spaced no more than 300 mm [10 ft] apart to form a panel of less than 14 $m^2$ [150 $ft^2$].

5.I.(3). Concrete masonry units. Concrete masonry units shall conform to ASTM C90, Specification for Hollow Load-Bearing Concrete Masonry Units, and shall be factory scored, fluted, or striated.

5.I.(4). Factory-prefinished siding. Factory-prefinished siding shall have a minimum non-prorated 15-year warranty on the finish. Aluminum or steel siding with or without backing are acceptable only on the second story of a structure or at least 2000 mm [6 ft] above finish grade. Siding shall be kept a minimum of 150 mm [6 inches] above finish grade. Lap siding shall be either single pieces with 203 mm [8 inches] maximum width course or single pieces shaped to simulate 200 mm [8 inches] maximum width courses (double-four, double-five, triple-four sidings are acceptable). Siding shall be installed in accordance with manufacturer's recommendations. A manufacturer's representative shall instruct the installer of the siding, appurtenances, and accessories as to the manufacturer's required installation procedures. The Government construction inspectors responsible for the job shall be included in their instruction. Panel materials in large surfaces shall be avoided unless surfaces are broken with textures or battens. Battens for prefinished materials shall also be factory finished. Requirements for various siding materials are as follows:

5.I.(4).(a). Aluminum siding shall conform to the requirements of AAMA 1402.3, Standard Specification for Aluminum Siding, Soffit, and Fascia, except aluminum substrate shall be a minimum of 0.6 mm [0.024 inch] thick if it is not fiberboard backed. For fiberboard backed aluminum siding, the aluminum substrate shall be a minimum of 0.5 mm [0.019 inch] thick. Aluminum siding shall not be installed within 1.6 km [1 mile] of open saltwater or in other highly corrosive atmospheres.

5.I.(4).(b). Steel siding material shall be a minimum of 0.017-inch thick [29 gage], zinc-coated steel conforming to ASTM A526, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality, and ASTM G90, Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight. Siding panels shall be formed to provide full-length edge interlock, so that after installation, fasteners will be concealed from view. Siding shall be pretreated and either factory-primed and finish-painted or factory-laminated with a weather-resistant polymer film. When tested for 500 hours in accordance with ASTM B117, Method of Salt Spray (Fog) Testing, the siding finish shall show no signs of cracking, blistering, peeling or significant color change, and shall show no loss of adhesion from the metal more than 1.6 mm [1/16-inch] beyond a line scratched or scribed through the coating. Steel siding shall not be installed within 1.6 km [1 mile] of open saltwater or in other highly corrosive atmospheres. Steel siding materials shall be separated from aluminum surfaces with a coating of bituminous paint or asphalt varnish.

5.I.(4).(c). Vinyl siding shall conform to the requirements of ASTM D3679, Rigid Poly (Vinyl Chloride) (PVC) Siding and shall be a minimum of 1.16 mm [0.044 inch] thick.

5.I.(4).(d). Hardboard and cement asbestos shingle siding are not acceptable.

5.I.(5). Trim elements. Aluminum or vinyl clad wood trim is preferred over painted or stained wood trim. Painted exterior surfaces shall be minimized. When exterior exposed wood trim is used, the following requirements apply:

5.I.(5).(a). Wood fascia and rakes are required and shall be 25 mm [1 inch] nominal boards with solid blocking or 50 mm [2-inch] nominal boards without blocking. Plywood, hardboard, or gypsum board are not permitted for fascias or rakes.

5.I.(5).(b). Exposed wood, such as window trim, door sills, window sills, railings and balusters, wood fencing, solar shading devices including louvers, arbors, and trellis shall be treated for rot resistance in accordance with NWWDA Industry Standards I.S.4, Water Repellant Preservative Treatment for Millwork.

5.I.(5).(c). Exterior surfaces requiring painting shall receive a minimum of one prime coat and two finish coats of

paint. Wood trim frames, etc., shall be back primed. Exterior semi-transparent stains, two coats, are acceptable, where appropriate for wood, plywood, etc.

5.l.(6). Exterior ceilings and soffits. Exposure of roof framing and underside of roof/floor decks are not permitted. Exterior ceilings and soffits will be trimmed or otherwise architecturally treated and coordinated with siding. Exterior ceilings and/or soffits may be prefinished metal, vinyl, plywood, or 9.5 mm [3/8-inch] 303 medium density overlay siding material, EXT-APA conforming to American Plywood Association Standard B840, 303 Siding Manufacturing Specifications. Cement asbestos ceiling or soffit are not permitted.

5.l.(7). Patios. Patios shall be sloped to drain and have a broom-finished concrete floor surface.

5.l.(8). Balconies and porches shall be sloped to drain away from the unit and have a concrete floor surface which provides a waterproof and non-slip surface. Plastic coating or films over concrete decks are not acceptable. Exposed wood decks, stained or painted, are not acceptable. Balcony topping shall have a minimum thickness of 38 mm [1 1/2-inch] with welded-wire mesh reinforcement. Exposed wood rails and trim shall be treated to deter damage from [moisture decay and insect infestation.]

5.l.(9). Exterior Stairs. Exterior stair treads and landings shall be constructed of concrete or steel, and provided with non-slip type treads. Exposed wood rails and trim shall be treated to deter damage from [moisture decay and insect infestation].

5.m. Glazed Openings. Windows and glazed door (50 percent or more glass) units shall meet the following standards and must be certified by an independent testing laboratory. Windows that slide (double-hung, single-hung, and horizontal sliding) and glass exterior doors shall meet the standards for hung units. Standards for casement windows shall apply to all hinged or fixed windows. Other window types may be used if they have been tested and conform to the standards for hung windows. The Contractor shall provide the manufacturer's certification that the window provided meets the following test requirements:

5.m.(1). Required tests. Hung units will meet a National Fenestration Rating Council (NFRC) design pressure rating of 25. Casement windows will meet NFRC design pressure rating of 40. Evidence of passing the following specific tests and minimum standards are required to achieve these design pressure standards.

5.m.(1).(a). Structural testing. Using ASTM E330 test results shall demonstrate no glass breakage, damage to hardware, or permanent deformation that would cause any malfunction or impair the operation of the unit. Residual deflection of any member shall not exceed 0.4 percent of its span. Hung windows shall be tested at pressures of 1796 Pa [37.5 $lb/ft^2$], and casement windows shall be tested at pressures of 2873 Pa [60.0 $lb/ft^2$].

5.m.(1).(b). Operating force. The force necessary to unlatch and open units shall not exceed 13.6 k [30 lb] for hung units and 15.9 k [35 lb] for casements.

5.m.(1).(c). Air infiltration. Using ASTM E283 leakage rate shall not exceed 0.65 $l/min/m^2$ [0.25 $ft^3/min/ft^2$] for hung units and 0.39 $l/min/m^2$ [0.15 $ft^3/min/ft^2$] for casements, at a test pressure of 7.66 $k/m^2$ [1.57 $lb/ft^2$].

5.m.(1).(d). Water penetration. Using ASTM E547, no leakage shall be evident when tested in three, five-minute cycles with a one-minute rest period between cycles at 18.3 $k/m^2$ [3.75 $lb/ft^2$] for hung units and 29.3 $k/m^2$ [6.0 $lb/ft^2$] for casements.

5.m.(1).(e). U-Value. Whole window U-values shall comply with Table 7-2. U-values shall be calculated using ASTM E1423 and NFRC 100-91.

5.m.(2). Glazed doors. Glazed doors shall have insulated steel, vinyl clad wood, or thermally broken aluminum frames conforming to the above requirements. Finish shall be factory applied and conform to 44-C-22431 in accordance with the requirements of the National Association of Architectural Metal Manufacturers (NAAMM) Metal Finishes Manual. Operable panels shall be equipped with screens. Sliding panel screens shall have extruded aluminum tubular frames mitered at corners, channel-shaped corner angle reinforcement, and nylon bottom rollers. Doors shall have interior operated latch, and securing pin or throw-bolt in frame. Screening shall be nonferrous.

5.m.(3). Glazing. Units shall be double glazed with low E-glass. [Requirement may be deleted in weather zones 9 and 10.]

5.m.(4). Interior window stools shall be solid-wood, paint-grades with a minimum thickness of 19-mm [3/4-inch]. Marble or ceramic tile sills are preferred in masonry construction.

5.n. Screens. Screens shall be provided at all operable sashes and sliding doors. Screens shall be nonferrous, of window manufacturer's standard design, and conform to AAMA 1002.10, Voluntary Specification for Aluminum Insulating Storm Products for Windows and Sliding Doors.

[Design District Technical Specialists may wish to discuss and consider "sunscreen" material with their installations in hot climates. Sunscreens (screen composed of more dense mesh screening material than standard insect screens) fit in the same screen track and continue to act as an effective insect screen and also as a Solar Heat Gain Coefficient (SHGC) reducer should be considered for installation in west- and east-facing windows, and in south-facing windows that do not have passive solar overhang shading. In hot climates solar heat gain through the windows is often responsible for 50% or more of the air conditioning load, and sunscreen is an effective, low-cost, passive and persistent means of reducing it. This is not a mandatory requirement.]

5.o. Window Treatments. Provide 25 mm [1 inch] metal blinds at windows and glazed hung doors. Color shall be manufacturer's standard off white, and shall be coordinated with wall color. Provide single-draw traverse rod and draperies at sliding glass doors. [Edit to indicate drapery specification.]

5.p. Doors. See Table 7-2 for thermal performance requirements for exterior doors.

5.p.(1). Entrance doors. The housing unit primary entrance door shall be 900 mm [3 ft] in width by 2050 mm [6 ft-8 inches] in height by 45 mm [1-3/4 inch] thick, thermal metal. Other housing unit entrance doors should meet this requirement but may be of lesser width.

5.p.(2). Bulk storage door. Exterior bulk storage door shall be a minimum 35 mm [1-3/8 inch] thick, exterior grade, thermal metal, or hollow core metal. Doors may be omitted when storage areas are located in garages.

5.p.(3). Aluminum screen and storm doors. [Insert "Not Used" and delete remainder of text if not applicable.] Screen and self-storing storm doors shall be provided for all housing unit exterior hinged doors. Frames shall be a minimum of 32-mm [1-1/4-inch] thick and 51 mm [2 inches] wide. Aluminum alloy materials shall be not less than 1.27-mm [0.05-inch] thick and 51 mm [2 inches] wide. Doors shall have solid bottom panels and midsection protective grills. Screening materials shall be nonferrous.

5.p.(4). Interior doors. Interior doors shall be 2050 mm [6 ft -8 inches] in height by 35 mm [1-3/8 inch] thick, hollow core wood or hollow panel. Wood doors will be painted. [Insert "Louvered doors are required for closets." This is a user and district option in areas where humidity, mold, or mildew are problems.]

5.q. Builders Hardware. Hinges, locks, and latches will comply with the specifications indicated in Table 5-10, and the following subparagraphs:

**TABLE 5-10 – HARDWARE SPECIFICATIONS**

| Hardware Type/ Specification | Specific Requirements |
|---|---|
| Hinges BHMA 101 | Hinges shall be 102 mm x 102 mm [4 in x 4 in] at exterior doors, and 90 mm x 90 mm [3-1/2 in x 3-1/2 in] at interior doors. |

**TABLE 5-10 – HARDWARE SPECIFICATIONS**

| Hardware Type/ Specification | Specific Requirements |
|---|---|
| Locks & Latches BHMA 601 | Series 4000, Grade 2, at exterior doors. Grade 2 or 3 at interior doors. Provide trim of wrought brass, aluminum, or stainless steel. |
| Auxiliary Locks BHMA 501 | Series 4000, Grade 2. Provide matching trim of wrought brass, aluminum, or stainless steel. |
| Interconnected Lock & Latches BHMA 611 | Grade 2. Provide matching trim of wrought brass, aluminum, or stainless steel. |
| Closers BHMA 301 | Series CO2000, Grade 2. |

5.q.(1). Locks and keys. Lock cylinders shall have six pin tumblers and interchangeable cores which are removable by a control key. Provide a master keying system. Locks for each housing unit, including exterior storage and garage door(s), shall be keyed alike. The Contractor shall provide one extra set of cores for each 50 housing units and furnish four keys for each key change and for master key system and control key. Locks and keys shall conform to the standards and requirements of the Builders Hardware Manufacturers Association (BHMA) listed above. [Include special requirements for conformity with Installation master keying system.]

5.q.(2). Weatherstripping and exterior thresholds. Provide nonferrous metal or vinyl weatherstripping for all housing unit exterior doors. Vinyl magnetic weatherstripping is acceptable for metal doors. Exterior thresholds shall be nonferrous metal.

5.q.(3). Applications. Locks and hinges shall be applied as follows:

5.q.(3).(a). Exterior hinged doors shall have 1-1/2 pair of hinges, lockset, and an auxiliary lock or interconnected lock and latch,

5.q.(3).(b). Each windowless entrance door will have a viewer mounted at eye level.

5.q.(3).(c). Exterior bulk storage door shall have 1-1/2 pair of hinges and lockset.

5.q.(3).(d). Interior doors shall have one pair of hinges and latchset with BHMA 601, F75 or F76 operations.

5.q.(3).(e). Doors in fire-rated walls, housing unit to garage, shall have 1-1/2 pair of ball-bearing hinges, lockset, auxiliary lock or interconnected lock and latch and closer.

5.q.(3).(f). Garage side exterior doors shall have 1-1/2 pair of hinges and lockset.

5.r. Postal Service and Building Signage.

5.r.(1). Postal Service. All new units shall be provided with an individual mailbox. [Design District shall coordinate with the Installation and the local postal authority with respect to mail delivery requirements as well as installation requirements.]

5.r.(2). Building Signage. All new units shall be provided with building identification signage in accordance with the Installation Design Guide requirements.

5.s. Kitchen Cabinets. Cabinets shall be factory manufactured of wood. Wall cabinets shall have adjustable shelves. Cabinets shall have magnetic catches except where spring-loaded self-closing hinges are provided. Cabinets shall include knobs/handles and or pulls and shall conform to ANSI A1.61.1, Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets, except where modified below. Wall and base cabinets shall be essentially of the same construction and appearance. Refer to Table 5-5 for minimum kitchen cabinet area requirements.

5.s.(1). Cabinets construction. Construct cabinets with frame fronts and solid ends, or of frame construction throughout. Frame members shall be mortised and tendoned, dove-tailed or doweled, and glued together. Brace the top and bottom corners with hardwood blocks that are glued with water-resistant glue and nailed in place. Wood cabinet materials and dimensions - Materials and minimum dimensions and thicknesses for cabinet construction materials shall comply with Table 5-11.

**TABLE 5-11 – KITCHEN CABINET SPECIFICATIONS**

| Element Description | Specific Requirements |
|---|---|
| Frame Members | 19 mm x 38 mm [3/4 in x 1-1/2 in] kiln-dried hardwood. |
| Base Cabinet Toe Space | 64 mm deep x 102 mm high [2-1/2 in x 4 in]. |
| Cabinet Bottoms, Backs & Tops (Unexposed) | 5 mm [ 3/16 in] hardwood plywood or 3 mm [1/8] in tempered hardboard. Provide bottoms in kitchen sink cabinets. Brace bottoms with wood members glued in place. |
| Cabinet Ends & (Exposed Backs/Bottoms) | Hardwood plywood, 5 ply, good grade for natural finish. Base Cabinets: 13 mm [1/2 in] Wall Cabinets: 10 mm [3/8 in] |
| Doors | 16 mm [5/8 in] hardwood plywood, good grade for natural finish, with hardwood trim. Raised panel or recessed panel. |
| Drawer Slides/Glides | 20 gauge metal. |
| Drawer Fronts | 16 mm [5/8 in] solid hardwood, matching doors. |
| Drawer Bottoms | 3 mm [1/8 in] softwood plywood, Grade A-B veneer or 3 mm [1/8 in] tempered hardboard. Bottoms 380 mm [15 in] wide shall be braced and glued in place. |
| Interior Partitions | 13 mm [1/2 in] hardwood or softwood plywood, Grade A-A or comparable veneer. |

**TABLE 5-11 – KITCHEN CABINET SPECIFICATIONS**

| Element Description | Specific Requirements |
|---|---|
| Shelves | 13 mm [1/2 in], softwood plywood (Grade A-B Veneer), hardwood plywood (good grade veneer), or glued-up solid wood.<br>Support shelves on ends and on 610 mm [24 in] centers.<br>Shelf edges exposed to view shall be rounded, filled, sanded, and finished. |

5.s.(2). Countertops. Countertops finish may be high pressure laminated plastic 1.1-mm [0.043-inch] thick for post-formed tops or 1.3-mm [0.05-inch] thick for countertops with separate backsplash, and shall be applied with heat-resistive adhesive. Countertops may also be ceramic tile or homogeneous, non-porous, solid surface materials. Minimum backsplash height is 100 mm [4 inches]. The substrate for countertops (except solid surface countertops) shall be 19 mm [3/4-inch] thick exterior plywood.

5.t. Appliances. Provide the following equipment in accordance with specifications listed, one each per housing unit. A listing of currently labeled Energy Star appliances is available through the internet at the EPA ebsite: http://www.energystar.gov/products/appliances.html.

5.t.(1). Refrigerators. Comply with UL 250, Household Refrigerators and Freezers and shall bear the EPA "Energy Star" certified label. Provide refrigerator with frostproof top freezer, automatic defrosting, and ice maker. Refrigerator shall have two vegetable bottom baskets, at least four adjustable shelves, at least two shelves and egg container in door; freezer compartment shall contain separate interior shelves, multiple door shelves, and ice maker. Provide reversible (left swing and right swing interchangeable) doors. Refrigerators shall conform to the energy compliance standards of 10 CFR 430, including those refrigerators manufactured before the code took effect. The use of refrigerants with an Ozone Depletion Potential (ODP) of .05 or less is required. Minimum refrigerator volume and maximum energy use are as follows:

5.t.(1).(a). Volume: 0.58 CM, 21 CF

5.t.(1).(b). Energy Efficiency: 722 kWh/yr.

5.t.(2). Ranges and ovens. Ranges shall be 760 mm [30 inches] wide and provided with porcelain enamel cooktop, oven, clock and timer, oven light, and cooking surface light. Oven shall have black glass window door, broiler pan, and self-lock racks. [Applicable only to General Officer's housing unit. Delete remainder [text] if project does not include a General Officer's housing unit(s). (Ranges for all General Officer's housing units shall be the double oven type with separate burner top). Over-under microwave and conventional oven combinations will satisfy the double oven requirement.] Use either gas or electric range, depending upon energy fuel source.

5.t.(2).(a). Gas ranges shall have two, 150 mm [6-inch] and two, 205 mm [8-inch] burners, a self-cleaning oven, and AGA-approved electronic ignition. Gas ranges shall be in accordance with AGA Z21.1, American National Standard for Household Cooking Gas Appliances.

5.t.(2).(b). Electric ranges shall have four tubular plug-in surface elements of 4,500 watts minimum, removable reflector bowls, infinite-control switches, and range-indicating lights. Ovens shall be equipped with one, 2,000-watt (minimum) tubular broil element and one, 700-watt (minimum) bake element, oven indicating light, thermostatic heat control, utensil drawer, and self-cleaning oven. Electric ranges shall conform to UL 858, Household Electric Ranges.

5.t.(3). Microwave ovens. [Applicable only to General Officer's housing units. Insert "...(DELETED)" and delete remainder of text if not required.] Provide microwave oven(s) for the following housing units: [Insert requirement]. Ovens shall conform to UL 923, Microwave Cooking Appliances, and be UL listed, minimum 0.042 $m^3$ [1.5 $ft^3$], stainless steel interior, automatic oven light, built-in browning element, and temperature probe.

5.t.(4). Range hoods. Provide metal range hoods, the same length and finish as the range, with separately switched light and exhaust fan. The hood shall have a washable filter. The fan shall have a capacity of not less than 78.7 L/s per meter of range hood [50 cubic ft per minute per linear foot of range hood]. The sound level shall not exceed 6 sones. Duct the fan to the exterior and provide backdraft protection.

5.t.(5). Garbage disposals. Garbage disposals shall conform to UL 430; Waste Disposers; continuous feed, minimum 1/2 HP motor, stainless steel grinding elements, two 360-degree stainless steel swivel impellers, manual motor reset, and sound insulation. [A plug connector is required.]

5.t.(6). Dishwashers. Dishwashers shall conform to UL 749, Household Electric Dishwashers, and be UL listed, electric type, with air gap, racks, lift-out utensil holder, spraying arms, and detergent dispenser. Unit shall be listed as "Energy Star" compliant and shall bear the "Energy Star" label. The automatic controls shall cycle through the Wash, Rinse, Dry / Heat, and Stop phases, and shall be capable of rinse and hold cycle as well as a no heat drying feature. The unit shall contain instantaneous, or in-line, water heater booster, with automatic thermostat set for 60 degrees C [140 degrees F]. Rated energy use for standard capacity models will not exceed 620 kWh/yr.

5.t.(7). Water heater. See paragraph 8.

5.t.(8). Ceiling Fans. See paragraph 10.

5.t.(9). Color. Kitchen appliances, except disposals, shall be of matching finish, [white/almond] in color.

5.u. Maintainability. The design of housing units including the selection and specifying of exterior and interior finishes, equipment, appliances, and systems shall include consideration of maintenance ease and cost. Avoid products that require continuing maintenance at high cost.

**6. UNIT DESIGN - STRUCTURAL.**

Structural design for apartment housing (materials and construction) shall comply with the regional model code (Uniform Building Code, BOCA National Building Code, or SBCCI Standard Housing Code). One and two family housing, including townhouses, shall comply with Council of American Building Officials (CABO) One and Two Family Dwelling Code. Structures which qualify as "Manufactured Homes" shall comply with the Federal Manufactured Housing Construction and Safety Standards Act (FMHCSS), except as modified herein.

6.a. Lateral Resistance. Walls used or required for lateral resistance to wind or earthquake, shall be considered bearing walls and shall have full foundations.

6.b. Embedded Steel. Nonstructural steel (handrails, etc.) embedded in concrete shall be galvanized or painted wrought iron. All damaged galvanized areas shall be repaired prior to embedment.

6.c. Wood Flooring Systems. Wood flooring systems shall be glued and nailed. Glue lines shall not be considered for stress transfer.

6.c.(1). Subfloor. Plywood is preferred as subfloor, and is required for wet areas (ie., bathrooms, kitchens, utility rooms). Subfloor will be rated for exposure 1 or exterior use.

6.c.(2). Underlayment: Sanded face underlayment (plywood) is required with ceramic tile, vinyl tile, sheet vinyl, and carpet. Underlayment must be a minimum thickness of 8.7 mm (11/32 inches). Acceptable sanded face underlayment panels can be APA rated A-C, B-C, A-D, B-D, or C-C plugged. Underlayment should be rated for Exposure 1 or exterior use. Underlayment should be installed after interior finish work is complete to avoid damage to the underlayment.

6.d. Frost Penetration. Foundations and utilities shall be located below the depth of maximum frost penetration.

6.e. Construction Tolerances. Allowable variations from level, or specified slopes, shall be as follows:

6.e.(1). For overall length, or surface of 3000 mm [10 ft] or less: plus or minus 3-mm [1/8-inch].

6.e.(2). Up to 6100 mm [20 ft]: plus or minus 6 mm [1/4-inch].

6.e.(3). Up to 12 000 mm [40 ft]: plus or minus 9 mm [3/8-inch].

6.f. Concrete Reinforcement: Fiber reinforced concrete is not an acceptable alternative to be utilized in this project.

6.g. Tornado Protection Shelter: The design of the housing unit shall include the provision for a tornado shelter to protect the occupants during tornado events. This shelter shall be sized and designed as recommended by the FEMA National Performance Criteria for Tornado Shelters, dated May 28, 1999. The tornado shelter shall be incorporated into the building design whereby an interior space shall be designated as the tornado shelter. This interior space shall be constructed in accordance with FEMA criteria to provide protection from wind, airborne debris missiles, and shall include ventilation considerations. [Design Districts shall include this paragraph only when the project is being constructed in a location which is considered by FEMA guidelines (FEMA 320) to be "High Risk", the provision of tornado shelters must be included in the 1391 and all project programming to support inclusion of this technical requirement.]

**7. UNIT DESIGN - THERMAL PERFORMANCE.**

7.a. Thermal Characteristics. See Table 10-1 for identification of appropriate weather region. [Weather regions are identified in Table 7-1. Select the appropriate weather region and delete Table 7-1 and its associated notes after completing Table 10-1.] Housing unit construction shall provide at least the minimum R values / maximum U values indicated in Table 7-2 for the appropriate weather region. R and U values shall be calculated in accordance with ASHRAE methods.

**TABLE 7-1 - WEATHER REGION DEFINITIONS**

| Weather Region | Cooling Degree Days | Heating Degree Days | |
|---|---|---|---|
| 1 | N/A | > 8,333 [ 15,000 ] | N/A |
| 2 | N/A | > 7,222 [ 13,000 ] | </= 8,333 [ 15,000 ] |
| 3 | N/A | > 6,111 [ 11,000 ] | </= 7,222 [ 13,000 ] |
| 4 | <1,111 [ 2,000 ] | > 5,000 [ 9,000 ] | </= 6,111 [ 11,000 ] |
| 5 | <1,111 [ 2,000 ] | > 3,889 [ 7,000 ] | </= 5,000 [ 9,000 ] |
| 6 | <1,111 [ 2,000 ] | > 3,056 [ 5,500 ] | </= 3,889 [ 7,000 ] |
| 7 | <1,111 [ 2,000 ] | > 2,222 [ 4,000 ] | </= 3,056 [ 5,500 ] |
| 8 | <1,111 [ 2,000 ] | > 1,111 [ 2,000 ] | </= 2,222 [ 4,000 ] |
| 9 | <1,111 [ 2,000 ] | N/A | </= 1,111 [ 2,000 ] |
| 10 | > 1,111 [ 2,000 ] | N/A | </= 1,111 [ 2,000 ] |
| 11 | > 1,111 [ 2,000 ] | > 1,111 [ 2,000 ] | N/A |

NOTES:

1. Include in the solicitation the correct weather data for the project site, taken from TM 5-785, Engineering Weather Data, and indicate the appropriate weather region on this table.
2. Heating Degree Days are formulated on a Range Base of 18C [65F]
3. Cooling Degree Days are formulated on a Range Base of 18C [65F]
4. Weather Regions 1, 2, and 3 are determined by the Heating Degree Day Range independent of the Cooling Degree Days.
5. Weather Regions 4, 5, 6, 7, 8, and 9 are determined by the Cooling Degree Days being less than 1,111 [ 2,000 ] and then by the appropriate range bracket for the Heating Degree Days.
6. Weather Regions 10 and 11 are determined by the Cooling Degree Days being greater than 1,111 [ 2,000 ] and then by the appropriate range bracket of Heating Degree Days.

**TABLE 7-2 – THERMAL CHARACTERISTIC REQUIREMENTS[1, 2]**

| Weather Region | Wall[3] R Value | Ceiling / Roof R Value[4] | Crawl Space R Value[5] | Basement R Value[6] | Slab on Grade R Value[7] | Door R Value[8] | Glazed Openings U Value[9] | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Window | Door |
| 1 | 3.3 [19] | 10.6 [60] | 3.3 [19] | 2.6 [15] | 2.5 [14] | 0.9 [5] | 3.0 [0.33] | 2.0 [0.35] |
| 2 | 3.3 [19] | 10.6 [60] | 3.3 [19] | 2.6 [15] | 1.8 [10] | 0.9 [5] | 3.0 [0.33] | 2.0 [0.35] |
| 3 | 3.3 [19] | 8.6 [49] | 3.3 [19] | 2.6 [15] | 1.8 [10] | 0.9 [5] | 3.0 [0.34] | 2.0 [0.35] |
| 4 | 3.3 [19] | 8.6 [49] | 3.3 [19] | 2.6 [15] | 1.8 [10] | 0.9 [5] | 3.0 [0.34] | 2.0 [0.35] |
| 5 | 3.3 [19] | 8.6 [49] | 3.3 [19] | 1.9 [11] | 1.8 [10] | 0.9 [5] | 2.2 [0.38] | 2.2 [0.38] |
| 6 | 3.3 [19] | 8.6 [49] | 3.3 [19] | 1.8 [10] | 1.8 [10] | 0.9 [5] | 2.2 [0.38] | 2.2 [0.38] |
| 7 | 3.3 [19] | 6.7 [38] | 3.3 [19] | 1.8 [10] | 0.9 [5] | 0.9 [5] | 2.2 [0.38] | 2.2 [0.38] |
| 8 | 2.2 [13] | 6.7 [38] | 2.2 [13] | 1.8 [10] | 0.9 [5] | 0.9 [5] | 2.9 [0.50] | 2.2 [0.38] |
| 9 | 2.2 [13] | 5.3 [30] | 2.2 [13] | 0.9 [5] | 0.9 [5] | 0.9 [5] | 2.9 [0.50] | 2.2 [0.38] |
| 10 | 2.2 [13] | 5.3 [30] | 2.2 [13] | 0.9 [5] | 0.9 [5] | 0.9 [5] | 2.9 [0.50] | 2.2 [0.38] |
| 11 | 2.2 [13] | 6.7 [38] | 2.2 [13] | 1.8 [10] | 0.9 [5] | 0.9 [5] | 2.9 [0.50] | 2.2 [0.38] |

Note[1]: Metric R values are in square meter-kelvin (K)/watt. [English R values are bracketed, and are in square foot-degrees F/BTUH]. (R = 1 / U)

Note[2]: R values listed represent the minimum acceptable insulation values for each construction type. Listed U values represent the maximum thermal conductance allowed for windows and doors.

Note[3]: Requirements for opaque, exterior walls.

**TABLE 7-2 – THERMAL CHARACTERISTIC REQUIREMENTS[1, 2]**

| Weather Region | Wall[3] R Value | Ceiling / Roof R Value[4] | Crawl Space R Value[5] | Basement R Value[6] | Slab on Grade R Value[7] | Door R Value[8] | Glazed Openings U Value[9] | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Window | Door |

Note[4]: For buildings with ventilated attics, no credit may be taken for the roof construction. R value shall be computed for construction between conditioned space and ventilated attic or building exterior. Insulation for floors which extend over outside air spaces shall conform to the ceiling and roof requirements.

If cathedral ceilings are being used, the effective R-Value of the overall roof area must meet the required "Ceiling/Roof" performance level. The effective R-Value of the overall roof area can be determined by calculating the weighted average of the R-Values of the different areas (based on the percentage of the total roof area each type covers). For example, if the Ceiling/Roof insulation required was R-38 and 25% of the ceiling was cathedral insulated to R-19, and then the required R-Value for the remaining roof would be: (38-0.25*19)/0.75=44.33, or R-45 (min).

Note[5]: Requirements for crawl space exterior walls below uninsulated floors.

Note[6]: Requirements for basement wall insulation extending downward 3050 mm [10 ft] from outside finished grade, or downward from outside finished grade to basement floor, whichever is less.

Note[7]: Requirements for perimeter insulation. In Weather Regions 1 through 6, perimeter insulation shall extend 1220 mm [48 inches] down from the top of the slab, or down to the bottom of the slab then horizontally beneath the slab to a total distance of 1220 mm [48 inches]. In Weather Regions 7 through 11, perimeter insulation shall extend downward to a total distance of 610 mm [24 inches] as described above.

Note[8]: Requirements for opaque doors in exterior walls (insulated metal).

Note[9]: Window requirements for double pane, low emissivity glass windows as specified in paragraph 5.m. of this STATEMENT OF WORK. Total Window (including glazing and frame) U values as rated by the National Fenestration Rating Council (NFRC) shall be used. Glazing area in Weather Regions 1 and 2 shall be limited to 12 percent of the heated floor space. Glazing area in Weather Regions 3 through 11 shall be limited to 14 percent of the heated floor space. Solar Heat Gain Coefficient in Weather Regions 1 through 7 shall be limited to 0.55. Solar Heat Gain Coefficient in Weather Regions 8 through 11 shall be limited to 0.40.

7.b. Thermal Insulation.

7.b.(1). Characteristics. Thermal insulation shall have a flame-spread rating of 25 or less and a smoke-development rating of 50 or less, exclusive of the vapor barrier, when tested in accordance with ASTM E84. A vapor barrier shall be provided on the warm-in-winter side of exterior wall and ceiling insulation, except in humid areas as defined below. Polyurethane is allowed as an insulation material for slabs and outside concrete or unit masonry walls. It is prohibited as an injected insulation material in walls or floor cavities or within the building envelope.

7.b.(2). Humid area design. [Climates which have 3000 hours or more of 19.4 degrees C [67 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity, or climates which have 1500 hours or more of 22.8 degrees C [73 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity shall be considered humid areas.] In humid areas, interior surfaces of ceilings and exterior walls shall be covered with materials which allow escape of water vapor from inside the walls into the conditioned space to prevent the growth of mold on interior surfaces. The vapor barrier in humid areas shall have a maximum perm rating of 0.5, and shall be located on the

outside face of the exterior wall or ceiling insulation.

7.c. Air Infiltration.

7.c.(1). To limit air infiltration buildings will be sealed with an air infiltration barrier, installed in accordance with the manufacturer's recommendations. The building envelope shall be caulked, gasketed, weatherstripped or otherwise sealed: around window and door frames, between wall cavities and frames, between walls and ceiling and roof, between walls and floors, at access doors and panels, at utility penetrations through walls, floors, and roofs, and at any other exterior envelope joint which may be a source of air leakage. These steps, in combination with provision of a continuous vapor barrier and sealed ductwork as specified in paragraph 10. shall constitute tight building construction.

[Design District Technical specialists can review additional information from the EPA: See http://yosemite.epa.gov/appd/eshomes/eshaware.nsf/attachments/lib/$file/AirSealing.pdf]

7.c.(2). A blower door test, performed in accordance with ASTM E 779, Measuring Air Leakage by the Pressurization Method, shall be performed on 15 percent of the project buildings, which have been randomly selected by the Contracting Officer. If buildings are to be turned over in phases, the blower door test shall be performed on 15 percent of the buildings completed in each phase (not to exceed 10 buildings per phase). No additional testing will be required if ALL of the tested buildings pass the test requirements. If less than 100 percent of the tested buildings pass the test, an additional 10 percent of the project buildings (not to exceed 10 buildings) shall be tested. This process shall continue until 100 percent of the total number of tested buildings pass the blower door test. All proto-type units will be included in the required blower door testing procedures.

7.c.(2).(a). Before beginning the test, all combustion devices shall be turned off, and all intentional openings in the building envelope (dryer vent, bathroom and kitchen exhausts, etc.) shall be sealed. All doors and windows shall be closed and latched.

7.c.(2).(b). To pass the blower door test, the building shall have an air tightness rating within the range of 3 to 4 ACH at 50 Pa [0.2 inch of water]. The Contractor shall correct all housing units not found in compliance, and shall be responsible for all labor and materials required to reduce air leakage to within acceptable parameters. All testing shall be performed by a firm certified by the Associated Air Balance Council, the National Environment Balancing Bureau, or State licensed to perform such tests within the state where the project is being constructed.

7.c.(2).(c). Any measures taken to reduce the air leakage to acceptable values shall be permanent, and shall be implemented on all similar housing units.

**8. UNIT DESIGN - PLUMBING.**

Plumbing system shall be designed and installed in accordance with the National Standard Plumbing Code (PHCC). Inspection and testing of the plumbing system shall be performed as prescribed in the National Standard Plumbing Code. Additional consideration in the technical evaluation will be given to systems which incorporate measures beyond the requirements of this STATEMENT OF WORK which are designed to increase energy conservation, ease of maintenance, or occupant comfort such as water filtration and purification, higher efficiency water heating systems, higher grade plumbing fixture materials (such as enameled cast iron tubs as opposed to enameled steel or plastic), etc.

8.a. Water Piping. Under slab supply piping shall be limited to housing unit service entrance only. Service line to each housing unit shall be no less than 25 mm [1 inch] diameter. All water piping shall be sized in accordance with methods outlined in the National Standard Plumbing Code, to limit water velocity in the pipe to 2440 mm/sec [8 ft/sec] unless a lower velocity is recommended by the plumbing fixture manufacturer(s). An isometric diagram of the water system shall be included in the design submittal. Allowable pipe materials are listed below:

8.a.(1). Copper tubing. Water piping under concrete slabs shall be copper tubing, type K, annealed. Joints under the slabs are prohibited. If copper tubing is selected for interior water piping, it shall be type K, L, or M hard-drawn copper. Type M copper tubing shall not be installed in exposed areas where the tubing may be exposed to external damage. Additional consideration in the technical evaluation shall be given to designs using copper types K or L. Fittings for soft copper tubing shall conform to ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes, and for hard-drawn to ANSI B16.22, Wrought Copper and Copper alloy Solder Joint Pressure Fittings.

8.a.(2). Chlorinated Polyvinyl Chloride (CPVC) Plastic Pipe. [Determine the acceptability of CPVC and edit text as required.] If plastic pipe is selected for interior water piping, it shall be Chlorinated Polyvinyl Chloride (CPVC) plastic pipe, conforming to ASTM D-2846, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Hot- and Cold-Water Distribution Systems. CPVC thicknesses shall meet Standard Design Ratio 11 for sizes 13-mm [½-inch] to 51 mm [2 inches] and shall be schedule 80 pipe for sizes larger than 51 mm [2 inches].

8.b. Soil, Waste, Vent, and Drain Piping. Soil, waste, vent, and drain, piping may be cast iron, copper, steel, or plastic suitable for installation in a residential waste, soil, vent, and drain system. Each fixture and piece of equipment, except water closets, requiring connection to the drainage system, shall be provided with a trap. Provide deep seal trapped drain for cooling coil condensate drain. Soil, waste, and drain piping installed below floor slabs shall be service weight hub and spigot cast iron or plastic pipe. Building waste main lines shall be no less than 102-mm (4-inch) diameter. All soil, waste, and drain piping shall be sized in accordance with the methods outlined in the National Standard Plumbing Code. An isometric diagram of the sanitary sewer system shall be included in the design submittal.

8.c. Gas Connections. The use of semirigid tubing and flexible connectors for gas equipment and appliances is prohibited, except that the final connections to the kitchen ranges shall be made using flexible connectors conforming to ANSI Z21.45, Flexible Connectors of Other Than All Metal Construction for Gas Appliances, not less than 1000 mm [40 inches] long. Provide accessible gas shutoff valve and coupling for each gas equipment item. Comply with UBC or model code seismic requirements . Exposed horizontal piping shall not be installed farther than 150 mm [6 inches] from the nearest parallel wall in laundry areas or areas where clothes hanging could be attempted. See paragraph 4.e. for gas line distribution requirements.

8.d. Plumbing Fixtures. Fixtures shall be provided complete with fittings, and chromium- or nickel-plated brass (polished bright or satin surface) trim. All fixtures, fittings, and trim in a project shall be from the same manufacturer and shall have the same finish.

8.d.(1). Plumbing shall meet the following criteria:

8.d.(1).(a). Exposed traps shall be chromium-plated, adjustable-bent tube, 20-gauge brass. Concealed traps may be plastic (ABS).

8.d.(1).(b). Faucets shall be single-control type, with seals and seats combined in one replaceable cartridge

designed to be interchangeable among lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as a part of a replaceable valve unit. Water flow shall be no more than .158 L/s [2.5 gpm] from any faucet.

8.d.(1).(c). Shower and bath combination shall be controlled by a diverter valve. Baths and shower and bath combinations shall be provided with waste fitting pop-up, concealed with all parts removable and renewable through the overflow and outlet openings in the tub. Showers and shower and bath combinations shall be equipped with a combination valve and flow control device to limit the flow to 0.158 L/s [2.5 gpm] at pressures between 137.9 to 413.7 kPa [20 and 60 psi].

8.d.(1).(d). Piping shall be concealed. Individual shutoff or stop valves shall be provided on water supply lines to all plumbing fixtures except bathtubs and showers. Shutoff valves shall be provided for each bathroom group. In multi-story units, additional consideration shall be given in the technical evaluation to designs which provide separate shutoff valves for each floor.

8.d.(1).(e). Fixtures shall be water conservation type, in accordance with the National Standard Plumbing Code.

8.d.(1).(f). Vitreous china plumbing fixtures shall conform to ANSI A112.19.2, Vitreous China Plumbing Fixtures. Stainless steel fixtures shall be in accordance with ANSI A112.19.3, Stainless Steel Plumbing Fixtures (residential design). Plastic fixtures shall conform to ANSI Z124. Enameled cast iron plumbing fixtures shall comply with ANSI A112.19.1, and enameled steel fixtures shall comply with ANSI A112.19.4.

8.d.(1).(g). Where tubs are installed in an end-to-end configuration in adjacent bathrooms the shower valve faucet end of the tubs shall not be back to back, but shall be located at opposite ends of the tubs to allow for maintenance and repair.

8.d.(2). Water closets. Water closets shall have regular bowl with inclined tank, close coupled siphon jet, floor outlet with wax gasket, closed-front seat and cover, and an anti-siphon float valve. Water consumption shall be no more than 6 L [1.6 gal] per complete flushing cycle. Water closet trim shall conform to ANSI A112.19.5, Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards).

8.d.(3). Lavatories. Lavatories shall be rectangular counter top type, minimum 508 by 457 mm [20 by 18 inches] in size or oval minimum 480 by 410 mm [19 by 16 inches] in size. Lavatories shall be vitreous china, cast iron rimless type (without rings), or cross-link acrylic molded counter top with integral bowl. Lavatories shall have pop-up drains.

8.d.(4). Bathtubs. Bathtubs shall be slip resistant and shall be constructed of enameled cast iron, porcelain enameled formed steel, or gel-coated, glass fiber reinforced polyester resin with wainscot. Metal bathtubs shall have fiberglass, porcelain-on-steel panels, or ceramic tile wainscot.

8.d.(5). Showers. Shower stalls shall be of ceramic tile, floor to ceiling, over membrane waterproofing on a cementitious substrate; or gel-coated, glass-fiber reinforced polyester. Shower receptors shall be slip resistant cast stone or gel-coated, glass-fiber-reinforced polyester. Shower stall wainscots shall be ceramic tile or gel-coated, glass-fiber-reinforced polyester.

8.d.(6). Kitchen sinks. Kitchen sinks shall be Type 302 stainless steel, 20-gauge minimum, seamless drawn, and sound deadened. Sinks shall be double bowl, self-mounting without mounting rings, complete with cup strainer and plug. Food waste disposers, where provided, shall be in accordance with UL 430 and ASSE 1008, and shall have a minimum motor size of 370 watts [½ horse power]. Strainer and plug shall be eliminated where food waste disposers are provided.

8.e. Clothes Washer Connections. Drainage and hot and cold water supply shall be provided for automatic clothes washers. Washer connection, complete with 50-mm [2-inch] drain, 20-mm [3/4-inch] hose thread supplies shall be provided in standard manufactured recessed wall box with single-face plate. Boxes shall be constructed of plastic or sheet steel. Steel boxes shall have a corrosion-resistant epoxy enamel finish. Boxes shall be mounted a minimum of 865 mm [2 ft-10 inches] above the finish floor. Electrical outlets for both washer and dryer shall also be provided.

8.f. Refrigerator Ice Maker Connection. Cold water supply shall be provided for GF refrigerator ice makers. Ice maker connection shall include an angle valve and a 1/4 inch hose thread supply, and shall be provided in standard manufactured recessed wall box with single-face plate (plastic or steel). Boxes shall be mounted a minimum 2 ft-10 inches above the finish floor.

8.g. Hose Bibbs. Hose bibbs shall be provided at the front and rear of each building, for each ground level housing unit. Hose bibbs shall be frostproof, and shall be supplied with an integral vacuum breaker.

8.h. Piping Location. Water piping running in crawl spaces and attics shall be installed on the warm side of insulation and shall be wrapped with insulation and a vapor barrier jacket. Determination of the warm side shall be the same as determined for vapor barrier location. No water piping runs in exterior walls shall be allowed, except in climates where the 99 percent dry bulb temperature is 1.7 degrees C [35 degrees F] or higher.

8.i. Cleanouts. Cleanouts shall be provided at each change in direction of sanitary sewer lines, at the intervals specified in the National Standard Plumbing Code, and at the building service entrance. All cleanouts shall be permanently accessible. Ground cleanouts shall be installed in a 305-mm by 305-mm [12-inch by 12-inch] concrete pad, flush with grade.

8.j. Water Heater. Water heaters shall have round, glass lined tanks, and shall be installed with an integral insulating wrap with a minimum R value of 5. Access shall be provided in the wrap for service and maintenance openings. Storage water heaters that are not equipped with integral heat traps and having vertical pipe risers shall be installed with heat traps directly on both the inlet and outlet. Circulating systems need not have heat traps installed. Hot water piping for the first 3050 mm [10 ft] downstream of the water heater shall be insulated. The water heater relief drain shall be manufacturer approved, and shall be indirectly connected to the building sanitary sewer system. Water heaters shall be sized in accordance with Table 8-1 for a 32 degrees C [90 degrees F] rise. Water heater energy factors shall meet or exceed the minimum requirements of 10 CFR 430. Additional consideration in the technical evaluation will be given to designs which include water heaters which exceed the minimum energy efficiency requirements and which utilize high efficiency, power vented, or sealed combustion water heaters.

**TABLE 8-1 - WATER HEATER SIZING**

| Requirements by Fuel Type | 2 BR | 3 BR | 4 BR | | 5 BR | |
|---|---|---|---|---|---|---|
| | 1 Bath | 2 Bath | 2 Bath | 3 Bath | 2 Bath | 3 Bath |
| Gas & Oil: | | | | | | |
| Storage (L [gal]) | 114 [30] | 151 [40] | 151 [40] | 194 [50] | 194 [50] | 194 [50] |
| 1 hour draw (L [gal]) | 227 [60] | 265 [70] | 273 [72] | 310 [82] | 341 [90] | 341 [90] |
| Recovery (L/h [gph]) | 114 [30] | 114 [30] | 121 [32] | 121 [32] | 151 [40] | 151 [40] |
| Electric: | | | | | | |
| Storage (L [gal]) | 114 [30] | 189[50] | 189[50] | 250 [66] | 250 [66] | 250 [66] |
| 1 hour draw (L [gal]) | 167 [44] | 273 [72] | 273 [72] | 333 [88] | 333 [88] | 333 [88] |
| Recovery (L/h [gph]) | 53 [14] | 83 [22] | 83 [22] | 83 [22] | 83 [22] | 83 [22] |

Note: Storage capacity, input, and recovery may vary with manufacturer. Any combination of the above which produces the required hour draw will be acceptable.

8.j.(1). Gas fired water heaters shall be in accordance with ANSI Z21.10.1, Water Heaters, Gas, Volume I, Storage Type, 22 kW [75,000 BTUH] Input or less, and shall be sealed combustion high efficiency type. Water heaters with powered ventilation shall be vented in accordance with manufacturer's instructions. Gas fired water heaters shall have annual energy use of 246 therms or less based on 10 CFR 430, Subpart B, Appendix E.

8.j.(2). Oil fired water heaters shall be in accordance with UL 732.

8.j.(3). Electric water heaters shall comply with UL 174, Water Heaters, Household Electric Storage Tank Type, and shall have an Annual Energy Use (kWh) of 4,773 or less based on DOE test procedure 10 CFR430, Sub-Part B, Appendix E.

**9. UNIT DESIGN - ELECTRICAL.**

9.a. Conformance to Code. The electrical system shall be designed in compliance with the rules and recommendations of ANSI C2, National Electrical Safety Code, and NFPA 70, National Electrical Code (NEC), and applicable model codes, whichever is more stringent. Provide main circuit breaker in the main panel for each housing unit, sized in accordance with the NEC.

9.b. Service Entrance. Service entrances, exterior meters, and panels shall be enclosed or sight screened. Service feeders shall be underground with exterior meters. Panel boards shall be painted galvanized steel and furnished with main breakers. Panel board doors shall be flush one-piece fronts. Panel boards may be surface or recessed mounted depending on their location. In hallways, panel boards shall be recessed. Offset a minimum of 400 mm [16 inches] horizontally back-to-back panel boards. No recessed panel boards are to be located in party walls and fire walls.

9.c. Panel Locations. Housing unit panels shall be located in the utility or laundry room, attached garage, or hallway.

9.d. Conductors. Conductors shall be copper.

9.e. Outlet Circuits. Lighting and convenience outlets shall be on separate circuits. Outlets on party walls shall be offset to maintain integrity of the fire wall and sound deadening rating of the wall.

9.f. Exterior Lighting and Outlets. Provide energy efficient high quality lighting for each housing unit. The minimum efficiency standard for lighting is 50 lumens/watt. This efficiency can be achieved with fluorescent and compact fluorescent lighting. Lighting must also be color corrected with a Color Rendering Index (CRI) of 60 or better. Provide a minimum of one lighting fixture and one ground-fault-protected outlet in each housing unit's entry, garage or carport, and patio or balcony area(s). Light fixtures at entry and patio or balcony areas shall be switched from the housing unit interior. Entry ways serving two or more housing units, and common carports, may have a common light, photocell activated, in lieu of individual switched lights. In addition, common trash areas shall be lighted. These lights shall be controlled by photocell, activated by minimum light levels of 5.4 Lx [0.5 foot-candle]. Provide a fixture in the patio area, except that the patio area light shall not be provided where the patio is adjacent to an exterior entrance and is adequately served by the lighting fixture required herein before. Lights for common areas as in gang carports and apartments shall be photo-electric cell controlled. Lights in common areas should have high impact-resistant plastic lenses, and/or be otherwise made vandal-proof.

[Design District may consider outdoor security (corner of house and patio floodlighting, not “streetlight-type fixtures”) be equipped with motion detectors in addition to photocell detectors. The motion detector capability can be overridden by the occupant. This is not a mandatory requirement]

9.g. Interior Lighting and Switched Outlets.
[Design District Technical Specialists may review http://www.epa.gov/appdstar/fixtures/index.html for additional information]

9.g.(1). Efficiency. Interior lighting will be both efficient and color corrected. Color Rendering Index (CRI) of 85 or better and a standard lighting color of 3500 K are required. Minimum efficiency standard for lighting are as follows:

9.g.(1).(a). Fluorescent tubes 1220 mm [4 ft] and longer: 90 lumens/watt.

9.g.(1).(b). Fluorescent tubes less than 1220 mm [4 ft]: 80 lumens/watt.

9.g.(1).(c). Compact fluorescent and other lamps: 50 lumens/watt.

9.g.(2). Locations. Provide light fixtures operated by wall switches for all rooms except living rooms. Living room shall have a convenience outlet, half controlled by a wall switch, located at the room entrance. Wall-switch operated ceiling lights shall be provided in dining and utility rooms, halls, bedrooms, kitchens, dinette areas, and basements.

Additional light fixtures shall be provided in rooms whose configuration requires them for adequate lighting. Wall-switch operated wall-mounted lights shall be provided in bathrooms and half baths located above the mirror over the lavatory. Walk-in closets and interior and exterior bulk storage rooms shall be provided with ceiling lights, either wall switch or pull-chain operated. A minimum of one lighting fixture, ceiling or wall mounted, as appropriate, shall be provided in the garage or carport. Where exterior bulk storage is located within the enclosed walls of a garage, each space shall be lighted separately. Garage lights shall be controlled by a switch (switches) located at each door opening into the garage.

[Design District may consider and coordinate with the Installation staff equipping certain indoor lighting fixtures that have tendencies to be inadvertently left on (e.g., utility rooms, children's bathrooms, garages) with occupancy sensors. These can be overridden by the occupants. This is not a mandatory requirement.]

9.g.(2).(a). Dining room ceiling light fixtures (hanging type) shall be movable by means of a track, chain and hooks, or other means in order to accommodate other than the typical dining room furniture arrangement. Fixtures may be designed for incandescent use, and do not have to meet the 50 L/Watt requirement. A Ceiling fan with integral lighting fixture may be substituted for this requirement.

9.g.(2).(b). The general lighting intensity in kitchens shall be 320 to 540 Lx [30 to 50 foot-candles]. Supplementary lighting shall be provided at the sink and under one of the wall cabinets for a work center to produce a composite lighting level of 210 Lx [75 foot-candles] using either down-lights, surface fluorescent fixtures surface-mounted below wall cabinets or wall-mounted fixtures (1520 mm [5 ft] and higher above the floor) as appropriate. Kitchen range hood shall be provided with a light, fan, and switches.

9.g.(2).(b).(1). The ceiling light fixtures boxes in the following rooms, living room, dining room, and all bedrooms shall be provided with a metallic fixture box suitably supported from the ceiling structure so that it may support a ceiling fan, and with additional wiring to allow for independent wall switch control of the fan and light.

9.h. Smoke Detectors. Provide hard-wired smoke detectors on a separate circuit in each housing unit in accordance with NFPA 72 and NFPA 101.

9.i. Carbon Monoxide Alarms: Provide carbon monoxide (CO) alarms for new and renovated family housing equipped with a fuel burning appliance inside of the unit, or a fireplace, or an attached garage. CO alarms will be provided as follows:

9.i.(1). One CO alarm shall be located on each level of the housing unit. A required alarm shall be located in vicinity of the bedrooms, such as in the corridor outside of the bedrooms. CO alarms will not be provided in garages, furnace rooms, unfinished basements or unfinished attics.

9.i.(2). CO alarms shall be hardwired and wall-mounted at the same height as the thermostat, approximately 52 inches off the floor. Dead air spaces such as corners shall be avoided. Units may be powered from circuits powering smoke detectors. In all cases, manufacturer's guidelines and recommendations shall be followed.

9.i.(3). CO alarms shall be equipped with an audible alarm, continuous digital display, peak level memory, test button, and test reset button and shall be UL listed by passing standard test UL 2034.

9.j. Telephone. Pre-wire housing units in accordance with local telephone company requirements. Provide outlets in kitchen, dining, or family area, living room and bedrooms of each housing unit. Eight position modular jack connectors shall be provided at all outlets. The jacks provided in the kitchen, dining, or family areas shall be for a wall-mounted phone. Wiring methods shall comply with EIA/TIA Standard 570, Residential and Light Commercial Telecommunications Wiring Standard. Cable and jacks shall be Category 5 per TIA/EIA 568A, Commercial Building Telecommunications Cabling Standard. Each housing unit shall be pre-wired separately from other housing units in the same building. All wiring shall terminate in a surface mounted, weatherproof, protected telephone terminal located on an outside wall adjacent to the building meter equipment. ("Demarcation Box"). The protected telephone terminal cover shall be provided with means for padlocking, shall be accessible from the outside, and shall be permanently labeled, "Telephone". Only one protected telephone terminal shall be required for each separate building. A single #10, CU, green equipment grounding conductor shall be run in 1/2-inch non-metallic conduit from

the building metering equipment to the protected telephone terminal box. Number of pairs and type of cable, type of modular jacks, and sizes of protected telephone terminals and outlet boxes shall be coordinated with local Telephone Company.

9.k. Television.

9.k.(1). Commercial Cable Television. Cable Television (TV) outlets shall be located in the living room, family room, and bedrooms. Units shall be prewired in conformance with all local cable TV company requirements. Each housing unit shall be prewired separately from other housing units in the same building. All wiring shall terminate in a surface mounted, weatherproof, protected television terminal ("Demarcation Box") located on an outside wall adjacent to the protected telephone terminal. The protected television terminal cover shall be provided with means for padlocking, shall be accessible from outside and shall be permanently labeled "Television". Only one protected television terminal shall be required for each separate building. A single #10, CU, green equipment grounding conductor shall be run in 1/2-inch non-metallic conduit from the building metering equipment to the protected telephone terminal box. Type of cable, type of tapoffs, and sizes of protected television terminals and outlet boxes, shall be coordinated with local cable TV Company.

9.k.(2). Commercial cable TV is the preferred system, if available. An antenna system or connection to a TV distribution system shall be provided for each housing unit. The TV system shall provide for UHF and VHF reception for color TV. The antenna system may be either a common antenna serving the entire project (mast or dish), an attic antenna system for each separate building, or attic antenna for each housing unit

9.l. Door Bell. The front entrance to each housing unit shall be provided with a low voltage bell or buzzer.

9.m. Convenience Outlets. In addition to outlets required by NEC, provide convenience outlets in the following areas:

9.m.(1). Utility Room

9.m.(2). Hallway outside bedrooms

9.m.(3). Garage

9.n. Special Outlets. Provide 240 V electric outlets for electric dryer, electric range, and window air conditioner units. [Delete reference to window air conditioners, if not applicable to the specific project.]

9.o. Wiring. Maximum use shall be made of nonmetallic sheathed cable for branch circuit wiring, and of service entrance cable for heavy-duty interior circuits and for service entrance conductors. Installed conductors in conduit shall be used only where specifically required by the NEC.

9.p. Branch Circuit Conductors. Branch circuit conductors and over current devices shall be as rated by NEC. A minimum of one spare circuit space in the panel shall be provided per housing unit. Individual circuits shall be provided for the washer, dryer (with receptacles located behind the washer and dryer), dishwasher, garbage disposal, freezer, electric range, furnace or air handling unit, air conditioning unit, and water heater. Two utility circuits (20 amp) shall be provided in the kitchen area for the convenience outlets for small appliances serving the kitchen, dining area, and family room area.

9.q. Engine Block Heaters. [Insert "...DELETED" and delete remainder of text if not required.] Provide 20 amp outlet on separate circuit for occupant-owned engine block heater. Locate the outlet adjacent to the garage door opening(outside).

**10. UNIT DESIGN - HEATING, VENTILATING, AND AIR CONDITIONING.**

[Delete all references to comfort cooling where air conditioning is not authorized. Delete references to inapplicable systems throughout the following paragraphs.]

10.a. Design. Heat gain and loss calculations shall be, as a minimum, in accordance with the current edition of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals or ACCA Manual J. The cooling load calculations shall be in accordance with ASHRAE Residential Cooling Load Calculations. Computer-generated load calculations shall be provided, and shall include complete input and output summaries. Design shall be based on the weather data shown in Table 10-1.

**TABLE 10-1 – WEATHER DATA[1]**

| Type of Design / Design Information | Metric | Inch-pound |
|---|---|---|
| Weather Region | | |
| Heating[2] | | |
| Indoor Design Temperature | 21 °C | 70 °F |
| Outdoor Design Temperature | Note[1] | Note[1] |
| Annual Heating Degree[3] Days | Note[1] | Note[1] |
| Largest Number of Monthly Heating Degree Days[3] | Note[1] | Note[1] |
| Cooling | | |
| Indoor Design Temperature | 24 °C | 75 °F |
| Outdoor Design Dry Bulb Temperature | Note[1] | Note[1] |
| Outdoor Design Wet Bulb Temperature | Note[1] | Note[1] |

Note[1]: [Insert weather data from TM 5-785, Engineering Weather Data.]
Note[2]: Bin weather data shall be provided after this table if heat pumps are a selected alternative.
Note[3]: Metric data are based on Celsius degree days to a base of 18 degrees C. Inch-pound data are based on degree days Fahrenheit to a base of 65 degrees F.

10.a.(1). Load calculations. Computer generated load calculations shall be performed for each possible orientation up to four representative orientations for each building type included in the project. Room air flow requirements shall be computed based on the individual room load. However, the minimum acceptable air flow shall be 2.5 $(L/s)/m^2$ [0.5 $cfm/ft^2$] for all spaces. The design for each individual housing unit shall be based on the heating and cooling loads as well as room airflow requirements computed for the building type and orientation which it most closely matches. Internal loads shall be included in the computerized load calculations in accordance with ASHRAE recommendations for residential analyses.

10.a.(2). Duct system layout. For a given building type, a single duct layout may be used regardless of orientation, provided that the system is sized to provide the required air flow for each room at its worst case orientation. Balancing dampers shall then be used to reduce air flow to the appropriate level as required. Permanent access to

dampers shall be provided.

10.b. Equipment Safety and Efficiency. All materials and equipment shall be the standard cataloged product of manufacturer's regularly engaged in production of such materials and equipment, and shall be the manufacturer's latest standard design. Each major component of the heating [and cooling] system[s] shall have the manufacturer's information on a plate secured to the equipment.

10.b.(1). All heating and cooling equipment proposed and installed in this contract shall bear the Energy Star Label.

10.b.(2). Equipment shall comply with the requirements of American Gas Association (AGA), American National Standards Institute (ANSI), Air Conditioning and Refrigeration Institute (ARI), American Society for Testing and Materials (ASTM), Gas Appliance Manufacturers Association (GAMA), National Electric Manufacturers Association (NEMA), National Fire Protection Association (NFPA), Underwriters Laboratories, Inc. (UL) or other national trade associations as applicable.

10.b.(3). Equipment efficiencies as listed in Table 10-3 below are minimum acceptable levels. Energy conservation as it relates to equipment operating costs will be considered in the evaluation process. Additional consideration in the technical evaluation will be given to designs which include higher than minimum efficiency equipment. [Verify that all available fuel sources have been compared on a life cycle cost basis prior to preparation of the RFP documents. Table 10-3 shall be edited, based on these comparisons, to retain all fuel options which fall within a range of 10 percent based on life cycle cost analysis. Fuel types which are proven to be ineffective through life cycle cost analysis shall be deleted from Table 10-3.]

**TABLE 10-3 - MINIMUM EQUIPMENT EFFICIENCIES**

| | Oil fired equip | Natural gas fired equip | LP gas fired equip | Electric heat pump (air cooled) | | Electric cooling equip |
|---|---|---|---|---|---|---|
| Furnace AFUE | 90%[1,4] | 90%[1,4] | 90%[1] | Size A[2] | Size B[2] | |
| Boiler Combustion Efficiency | 80% | 80% | 80% | | | |
| HSPF | | | | 7.7 | 8.5 | |
| SEER | | | | 12[3] | 13[3] | 12[3] |

Note[1]: Efficiency is based on DOE test procedure 10CFR430, Sub-Part B, Appendix N.

Note[2]: Size A heat pumps have a capacity of 5.9 kW [20,000 Btu/hr] or less. Size B heat pumps have a capacity of 5.9 to 13.5 kW [20,000 to 46,000 Btu/hr].

Note[3]: Efficiency is based on DOE test procedure 10CFR430, Sub-Part B, Appendix M.

Note [4]: [Design District may reduce the required furnace AFUE to not less than 80% in Weather Regions 8 through 11 based on the results of a life cycle cost analysis.]

10.c. Heating and Cooling Systems. Each housing unit shall be provided with central heating [and air conditioning] system[s]. Systems shall be designed, installed, balanced, and adjusted to distribute heat [and cooling] to all habitable rooms, as well as bathrooms, in proportion to the calculated load requirements of these spaces. [The Installation shall determine the allowable fuel types to be used for housing. All reasonably equivalent fuel options within a range of 10 percent based on life cycle cost analysis shall be allowed. The design activity may assist the Installation in preparation of the fuel life cycle cost comparison.] Fans in air handlers and furnaces shall be multi-speed, direct drive type. System installation shall conform to SMACNA Installation Standards for Residential Heating and Air Conditioning Systems except as altered by this document. Additional consideration in the technical evaluation

will be given to systems utilizing modular components, plugged power, drawer-type burner assemblies, additional space in the mechanical room, and other features which contribute to ease of system maintenance. Additional consideration will also be given to designs which provide measures beyond the requirements of this STATEMENT OF WORK to increase energy conservation or occupant comfort such as division of each housing unit into more than one conditioning zone for increased control.

10.c.(1). Equipment sizes selected for installation shall not oversized more than 125 percent of the calculated loads.
[Design District may review and incorporate reference to ACCA Manual S HVAC equipment sizing guidelines, or EPA equipment sizing recommendations at http://yosemite.epa.gov/appd/eshomes/eshaware.nsf/attachments/lib/$file/RightSizedAC.pdf.]

10.c.(2). Mechanical space shall be provided to house all mechanical equipment. [Coordinate with the Installation to determine preferred location of mechanical space, and shall then edit this paragraph to indicate the desired location. Factors such as ease of maintenance, storage of family wares, cost considerations, and possibility of freezing shall be considered.] Exterior air conditioning units shall be concrete pad-mounted, with location selected based on site specific conditions and intended uses of outdoor space. Effort shall be made to locate the unit(s) out of the occupant's direct line of sight (screen with shrubbery or wall, locate on sides of housing unit, avoid placement under windows, etc.). However, the primary concern shall be coordination with the mechanical area location. Mechanical equipment shall be located in an externally accessible utility room, and shall be arranged to allow for ease of maintenance, and for proper venting if required. This utility room shall be provided with a light and electrical receptacle. See paragraph 5.d.(3) for additional requirements for mechanical spaces containing fuel-fired heating equipment.

[Edit the following list as applicable to the particular project. If not required, insert "... (Deleted)" following subparagraph letter and delete remainder of text.]

10.c.(3). Forced warm air systems. Warm air furnaces shall be [induced combustion, upflow natural gas or No. 2 fuel oil-fired furnaces, or electric furnaces]. Furnaces shall be equipped with electronic ignition. [Natural gas or oil-fired furnaces shall be equipped with a flue to exhaust flue gases above the building roof. Units shall be vented in accordance with NFPA 211. Where high efficiency (AFUE > 90 percent) gas furnaces are selected for use these units shall be vented in accordance with AGA requirements and the manufacturer's instructions. Condensate drains for high efficiency units shall be manufacturer approved, and shall be indirectly connected to the building sanitary sewer system. Combustion air shall be provided from the outside in accordance with the appliance listing. For areas with a 97.5 percent outdoor dry bulb design temperature below -6.7 degrees C [20 degrees F], combustion air shall be provided in accordance with SMACNA Installation Standards for Residential Systems.] [Electric furnaces shall be sized to within 3 kW of the calculated load demand.] Furnaces shall be equipped with centrifugal fan, disposable filters, controls, and transformer. Fans shall be multi-speed, direct-drive type. It shall be possible to service and replace all controls and internal components from one side of the furnace. Heat exchangers shall be guaranteed for a minimum service life of 10 years. [In areas authorized for air conditioning, furnaces shall be equipped with a cooling coil by the same manufacturer, matched to the selected air conditioning equipment.]

10.c.(4). Forced hot water systems. Convectors and baseboard or wall radiation units shall have steel core and fin or nonferrous core and fin construction. Heating hot water shall be produced by [natural gas, No. 2 fuel oil-fired, or electric] boilers. A single boiler or multiple modular boilers shall be provided for each building with each housing unit in multi-family housing individually, thermostatically controlled by means of a three-way diverting valve. Each unit shall be provided with its own circulating system. Circulation shall be by means of a two-pipe reverse return system with the circulating pump(s) prevented from operation when the outside temperature is above 18 degrees C [65 degrees F]. Any sub-slab hot water distribution piping shall be installed without joints beneath the slab. Minimum acceptable individual convector control shall be accomplished by means of dampers at each unit. Additional consideration in the technical evaluation shall be given to designs which treat each convector as an individual heating zone by means of self contained or thermostatically controlled valves located at each unit. Greatest consideration shall be given to systems incorporating thermostatically controlled valves. Hot water piping shall be vented at all high points, and shall be provided with isolation valves at each vent to facilitate servicing. A minimum velocity of 0.61 m/s [2 fps] shall be maintained in the hot water piping. Strainers shall be provided as required to protect system equipment.

10.c.(5). Split system air conditioning and air to air heat pumps. [Heat pump data bracketed]. [Air to air heat pumps shall only be considered for use in locations with heating design temperatures (97.5 percent basis) greater than -11 degrees C [12 degrees F]. The use of heat pumps shall be allowed only after a thorough analysis of all available energy sources and systems. Geothermal heat pumps may be used in any geographical location where their equipment efficiencies will exceed those listed for air to air heat pumps]

10.c.(5).(a). Electric air conditioning [Heat pump system] equipment shall consist of an air-cooled condensing unit and evaporator [evaporator/blower] as matched components with the furnace, all by the same manufacturer. Refrigerants used shall have an Ozone Depletion Potential (ODP) of .05 or less. The condensing unit shall contain, as a minimum, the features indicated in Table 10-4. Equipment shall be sized to meet the total load determined by computer calculation. Equipment may be oversized to no more than 115 percent of the computer generated load. [Evaporator/blower for heat pump systems shall be provided complete with centrifugal fan, disposable filters, controls, and transformer.] Fans shall be multi-speed, direct drive type.

**TABLE 10-4 – SPLIT SYSTEM AIR CONDITIONING [HEAT PUMP] FEATURES**

| |
|---|
| High and low pressure compressor protection. |
| Filter-drier. |
| Hermetically sealed compressor with built-in overloads and locked rotor protection. |
| Electric crankcase heaters. |
| Reversing valve. (heat pump only) |
| Start and run capacitors. |
| Anti-short-cycle timer. (factory installed) |
| Testing and charging refrigerant connections. |
| Compressor guaranteed for a minimum service life of 5 years. |
| Dipped and baked Phenolic coating on condenser coil (for equipment installed within 16 km (10 mi) of the ocean or other large body of water). |
| Fan and coil guards. |

10.c.(5).(b). The evaporator coil [evaporator/blower] shall be provided with a liquid strainer, expansion device, pre-insulated housing, copper or aluminum coil, and insulated condensate drain pan. [Centrifugal blower, and electric resistance supplemental heaters.] Coil face velocity shall be limited to 2.8 m/s [550 fpm].

10.c.(5).(c). The condensing unit and matched coil [evaporator/blower] shall deliver a Seasonal Energy Efficiency Rating (SEER), consistent with the minimum requirements shown in Table 10-3.

10.c.(5).(d). [Supplementary electric heat. Each heat pump shall be provided with supplementary electric resistance heat. Electric resistance heat shall be sized to provide 100 percent of the calculated heat loss of the particular unit. Electric resistance heaters in excess of 5 kw shall be staged by means of an outdoor thermostat. Outdoor thermostat shall be installed and operated in accordance with the heat pump manufacturer's instructions.]

[Heat pumps shall only be considered for use in locations with heating design temperatures (97.5 percent basis) greater than -11 degrees C [12 degrees F]. The use of heat pumps shall be allowed only after a thorough analysis of all available energy sources and systems.]

10.c.(5).(d). Refrigerant Charge Verification: When split-system air conditioning systems are selected for

installation, the contractor shall check, calibrate, and charge the refrigerant system following installation and start-up of the equipment. These tests shall be accomplished on the same 15% of the units which undergo blower door and duct tightness testing. If the tested units show a low or excessive refrigerant charge, all new systems shall be checked after start-up, but prior to acceptance by the Government.

10.c.(6). Packaged air conditioning systems. Packaged air conditioning systems shall consist of a single, self-contained, exterior unit containing the burner, heat exchanger, compressor, condenser, evaporator, and blower. Unit shall be factory pre-piped, precharged, and prewired. Refrigerants used shall have an Ozone Depletion Potential (ODP) of .05 or less. The system shall deliver a Seasonal Energy Efficiency Rating (SEER) consistent with the minimum requirements shown in Table 10-3. The unit shall contain, as a minimum, the features indicated in Table 10-5. Length of exterior ducts between the unit and the building shall be limited to 610 mm [2 ft] maximum. Exterior duct shall be constructed of internally insulated sheet metal. Exterior duct shall also be provided with a sheet metal weather cover attached to the unit and the building, covering a minimum of the top and both sides of the ductwork. Equipment shall be sized to meet the total load determined by computer calculation.

**TABLE 10-5 - PACKAGED AIR CONDITIONING FEATURES**

| |
|---|
| High and low pressure compressor protection. |
| Filter-drier. |
| Hermetically sealed compressor with built-in overloads and locked rotor protection. |
| Electric crankcase heaters. |
| Start and run capacitors. |
| Anti-short-cycle timer. (factory installed) |
| Testing and charging refrigerant connections. |
| Compressor guaranteed for minimum service life of 5 years. |
| Dipped and baked Phenolic coating on condenser coil (for equipment installed within 16 km (10 mi) of the ocean or other large body of water). |
| Accessory electric heat (as required). |
| Insulated casing. |
| Fan and coil guards. |
| Drain outlet. |
| Duct adapter as required for interface with supply and return ductwork. |

10.c.(7). Evaporative coolers. [Evaporative coolers shall be considered only at installations which traditionally use evaporative cooling, and comfort conditions can be maintained through their use. Determine whether evaporative coolers will be allowed as a design option to the Contractor. In the event that evaporative coolers are allowed, edit the Minimum Equipment Efficiencies Table 10-3 to include a column for single stage evaporative coolers. Set minimum efficiency at 80 percent, and add the following text.] Units shall be a self-contained, single stage, weather-resistant type, and shall conform to\-UL 507-\ and \-UL 746C-\. The fan shall be centrifugal type and shall be complete with motor, drive equipment, and vibration-isolation supports between motor and fan housing on single phase motors. Water distributor or rotary wheel motor shall be provided with a time delay in the fan circuit to allow media to be thoroughly wetted before air flow starts. Manual or automatic reset type thermal overload protection shall be provided. Evaporative cooler fans shall have air delivery ratings based on \-AMCA 210-\ tests by an AMCA approved laboratory. An ultraviolet retarding agent shall be part of or applied on exterior nonmetallic components susceptible to ultraviolet degradation from sun rays and conforming to \-UL 746C-\. Evaporative media shall be

specifically manufactured for use with evaporative coolers. Media shall be honeycombed type, fabricated such that no moisture entrainment shall occur. Face velocities shall be limited to those recommended by media manufacturer. Indirect coolers shall consist of an air-to-air heat exchanger, water distribution header, scavenger fan and motor, recirculating water pump, supplemental cooling coil (as required), drain, overflow and makeup water lines and an accessible damper to allow change-over from heating to cooling. Air from the conditioned space shall be exhausted through the attic space with a backdraft damper provided at the ceiling exhaust register. Cooler shall be drainable, and shall be provided with a mounting frame. Evaporative coolers shall be controlled by an on-off switch, with a thermostat provided for heating only.

10.c.(8). Integrated Domestic Water Heating and Space Heating Systems. [USACE Design Districts are cautioned that application of this system type is limited to Weather Regions 6 through 11. Installation staff shall be consulted and agree that these type systems are acceptable. These systems are acceptable for use only where natural gas is available at the site. ] Units shall be provided with a dual-integrated system which consist of a domestic water heater (specifically approved for dual use) and a fan/coil equipped with hot water heating coil, centrifugal fan, disposable filters, controls, [air conditioning evaporator coil] ,and transformer. Fans shall be multi-speed, direct-drive type. It shall be possible to service and replace all controls and internal components from one side of the fan/coil. If this system type is selected for use, the domestic water heater must be sized in accordance with the requirements set forth below and not in accordance with the size indicated in paragraph 8 of this Statement of Work. Water heater size shall be in accordance with manufacturers guidelines, ASHRAE Transactions, Vol. 95, part 2, 1989 “Equipment Sizing Procedures for Combination Space-Heating/Water-Heating Systems”, and current industry practice. The integrated system must be able to recover from a large hot water draw in one hour or less while still supplying the required heating load. Both the water heater recovery rate and the storage capacity need to be adjusted to suit the integrated system. The water heaters proposed as a part of this system must have a minimum recovery efficiency level of 78%. Additional consideration during the evaluation will given to proposals which include high efficiency water heaters.

10.c.(9). Engineered High Velocity Duct Systems. [USACE Design Districts are cautioned that application of this system type is limited to Weather Regions 6 through 11. Installation staff shall be consulted and agree that these type systems are acceptable.] Units shall be provided with an engineered, high velocity duct system for the distribution of heated [and cooled] air throughout the unit. This system shall be the product of a manufacturer regularly engaged in the manufacture of these type systems. Systems will contain a fan/coil specifically designed for this type system which include a heating coil, high pressure blower, [refrigerant coil for heat pump or cooling applications]; rigid rectangular or round trunk ducts, and 50 mm [2 inch] round, pre-insulated, sound dampened, flexible duct run-outs to outlets. Outlets shall be paintable plastic finished to match the ceiling color. All outlets shall be located in the ceilings. This type system is suitable for use with hot water heating systems (not integrated with the domestic water heater) or heat pump systems.

10.c.(10),. Unacceptable systems. Room unit heaters (see Note[1]); space heaters, room (window) air conditioning units; floor furnaces, gravity warm air systems, and electric resistance heaters (see Note[2]) are not permitted.

[Note[1]: Edit text. Room unit heaters may be used where required by outdoor design conditions to maintain a minimum temperature of 4.5 degrees C [40 degrees F] in mechanical rooms where required for equipment protection.

Note[2]: Edit text. Electric resistance heaters may be used for supplemental heat in air-to-air heat pumps.]

10.d. Air Distribution. Provide systems conforming to the recommendations of the ASHRAE Air Distribution Manual or the SMACNA Residential Comfort System Installation Standards Manual. For two-floor housing units with a single air conditioning unit, provide separate, main supply ducts with volume control dampers for each floor. These main ducts shall be run directly from the air handler or furnace to the appropriate building level. As a minimum, provide a separate ducted return for each floor level. Two-floor housing units with 93 $m^2$ [1,000 $ft^2$] or greater net floor area on each floor shall be provided with a separate heating and cooling unit and supply and return ducted system for each floor. Additional consideration in the technical evaluation will be given to designs which incorporate air distribution systems totally within the conditioned envelope.

10.d.(1) Supply diffusers. Wall, ceiling, and/or baseboard supply diffusers shall be located to ensure that the air

distribution will completely cover all surfaces of exterior walls with a blanket of conditioned air or may be of a compact design so long as 'dead spots' within the units are avoided. At least one diffuser shall be provided in each habitable room. Diffusers shall have louvered faces with individually adjustable blades, and shall be provided with integral opposed blade damper. Diffusers shall be provided with air deflectors as required for proper air flow in the space. Plastic diffusers are prohibited. Core velocity shall be limited to 3 m/sec [600 fpm] maximum, with a maximum pressure drop of 0.82 Pa/m [0.1 inch water]. Airflow from any single diffuser shall be limited to 94.4 L/s [200 cfm] maximum. Ceiling mounted units shall have factory finish to match ceiling color, and be installed with rims tight against ceiling. Sponge-rubber gaskets shall be provided between ceiling or wall and surface-mounted diffusers for air leakage control. Diffuser boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Suitable trim shall be provided for flush- mounted diffusers. Duct collar connecting the duct to diffuser shall be airtight and shall not interfere with volume controller. Wall supply registers shall be installed at least 150 mm [6 inches] below the ceiling.

10.d.(2). Return and exhaust grilles. Grilles shall be fixed horizontal or vertical louver type similar in appearance to the supply diffuser face. Plastic units are prohibited. Core velocity shall be limited to 2 m/sec [400 fpm] maximum, with a maximum pressure drop of 0.5 Pa/m [0.06 inch water]. Grilles shall be provided with sponge-rubber gasket between flanges and wall or ceiling. Register/grille boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Wall return grilles shall be located at least 150 mm [6 inches] above the floor. Return grilles shall be located in hallways, finished basements, or other normally unoccupied spaces to minimize the sound level in occupied spaces.

10.d.(3). Ductwork. Ductwork shall be externally insulated sheet metal or flexible metal. Length of flexible duct shall be limited to 1.8 m [6 ft]. Flexible ductwork shall not be spliced or joined and shall be a single continuous piece from diffuser boot to trunk/branch duct. Systems composed entirely of flexible ductwork with distribution boxes are prohibited. Sub-slab, intra-slab, or crawlspace ductwork is also prohibited. Volume dampers shall be provided at each branch take-off. All ductwork shall be concealed. No portion of the building construction (such as joist space in a floor or ceiling, wall stud space, etc.) shall be used as a duct. The requirements for ductwork set forth below apply to all ductwork installed in the housing unit, supply systems, return systems, exhaust systems, ventilation systems, and outside air supply ductwork.

10.d.(3).(a). Maximum velocity in supply ducts shall be limited to 4.6 m/s [900 fpm] for mains and 3.1 m/s [600 fpm] for branches.

10.d.(3).(b). Ducts shall be airtight with no visible or audible leaks to ensure quiet, economical system performance. Ductwork in conditioned spaces shall be constructed for a 250 Pa [1 inch] static pressure construction class with seal class C, as described in the SMACNA HVAC Duct Construction Standard, unless a higher pressure class and/or seal class is required by actual, system operating conditions. Ductwork in unconditioned spaces shall be constructed for a 500-Pa [2-inch] static pressure construction class with seal class C, unless a higher pressure class and/or seal class is required by actual, system operating conditions. All duct seams and joints shall be sealed using duct mastic. Tape shall not be used as a means for sealing ductwork.

10.d.(3).(c). For flexible ductwork, the inner core shall be mechanically fastened to all fittings, preferably using drawbands installed directly over the inner core and beaded fitting. If beaded fittings are not used, then the inner core shall be fastened to the fitting using #8 screws equally spaced around the diameter of the duct, and installed to capture the wire coil of the inner liner (3 screws for ducts up to 300 mm [12 inch] in diameter and 5 screws for ducts over 300 mm [12 inch] in diameter). The inner core must be sealed to the fitting using mastic or tape. Tape used for sealing the inner core shall be applied with at least 25 mm [1 inch] of tape on the duct lining and 25 mm [1 inch] of tape on the fitting, and shall be wrapped at least three times. The outer sleeve (vapor barrier) must be sealed at connections with a drawband and three wraps of approved tape. The vapor barrier must be complete without any holes or rips, and seams shall be sealed with mastic or approved tape. Pressure sensitive tapes used in conjunction with flexible duct connections shall be as recommended by the duct manufacturer and shall be UL 181A listed and so indicated with a UL 181A mark or aluminum-backed butyl adhesive tape (15 mil minimum). Drawbands shall be stainless steel worm drive hose clamps or UV resistant nylon duct ties.

10.d.(3).(d). Provide a minimum of 51-mm [2-inch] thick mineral fiber insulation (or other listed insulation with an equivalent R value) on the exterior of all ducts in unconditioned spaces. Exhaust ductwork does not require

insulation. Insulation shall be faced with a vapor barrier material having a performance rating not to exceed 1.0 perm. Insulation, vapor barrier, and closure systems shall be non-combustible as defined in NFPA 255, with a flame-spread rating of not more than 25, and a smoke development rating of not more than 50, as defined in ASTM E-84.

10.d.(3).(e). Return, exhaust, and ventilation air ductwork shall be sized for a maximum velocity of 4.6 m/sec [900 fpm]. Short runs of return air duct (1525 mm [5 ft] or less) which directly precede the air handler or furnace shall be acoustically lined to minimize noise.

10.d.(4) Fire dampers shall be located and installed in accordance with NFPA requirements, and shall conform to the requirements of UL 555. Fire dampers shall be automatic operating, and shall be rated for the maximum system velocity and pressure. Fire dampers shall be equipped with a steel sleeve or adequately sized frame installed in such a manner that disruption of the attached ductwork, if any, will not impair the operation of the damper. Dampers shall not reduce the duct or the air transfer opening cross-sectional area. Access doors shall be provided at all fire dampers.

10.d.(5) Filtration. Provide a pleated 25 mm [1 inch] panel filter, sized for and installed in the return air system in accordance with UL 900. Filter shall be rated for 20 percent efficiency as determined by ASHRAE 52, Method of Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter. All filters shall be easily accessible for changing and maintenance and shall be installed in the return grilles whenever possible. Additional consideration in the technical evaluation shall be given to designs utilizing electrostatic filters. Kitchen exhaust hoods shall be provided with aluminum grease filters sized to fit the exhaust duct.

10.e. Thermostats and Humidistats. Thermostats shall be located on interior partitions, approximately 1530mm [5 ft] above the finished floor. Locating a thermostat on the wall adjacent to a stairway, on an exterior wall, or where it is subject to unrepresentative temperatures is unacceptable.

10.e.(1). Thermostats shall be Energy Star labeled, microprocessor-based, with built-in key pads for scheduling of day and night temperature settings. Thermostats shall be programmable for heating only, cooling only, or heating and cooling as required. When out of the scheduling mode, thermostats shall have continuous display of time, with AM and PM indicator, continuous display of day of week, and either continuous display of room temperature with display of temperature set point on demand, or continuous display of temperature set point with display of room temperature on demand. In the programmable mode, the display shall be used for setting and interrogating time program ON-OFF set points for all 7 days of the week. The time program shall allow two separate temperature-setback intervals per day. Thermostats shall have a means for temporary and manual override of the program schedule, with automatic program restoration on the following day. Thermostats shall have a replaceable battery to maintain the timing and maintain the schedule in memory for one year in the event of a power outage. Maximum differential shall be ±1 degree C [±2 degrees F]. For a listing of Energy Star labeled thermostats see http://www.epa.gov/appdstar/hvac/thermostats.html. [When used for heat-pump applications, the thermostat shall have an emergency heat switch.]

10.e.(2). Humidistats, where required, shall be designed for indoor application and shall have a measurement range from 15 to 60 percent relative humidity (RH). The instrument shall be of the wall-mounted or return duct-mounted type, as required by the application, and shall be provided with any required accessories.

10.f. Humid Area Design. [Climates which have 3000 hours or more of 19.4 degrees C [67 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity, or climates which have 1500 hours or more of 22.8 degrees C [73 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity shall be considered humid areas.] In humid areas, all air heating and cooling systems shall be provided, and economy cycles will not be allowed. Closet and storage spaces shall have louvered doors, and building return air shall be drawn through these spaces to a ducted return air system. Cooling coils shall have a maximum of 315 fins/m [8 fins/inch] to allow for easy cleaning, and shall be sized for a maximum face velocity of 2.8 m/s [550 fps] to preclude moisture carryover. Heating and cooling equipment in humid areas shall be designed to meet the load determined by computer calculation. However, a larger fan may be required to meet minimum air flow requirements than would be anticipated based on the computer load. Equipment may be oversized by no more than 15 percent of the computer

generated sensible load.

10.g. Exhaust Fans. Bathroom and kitchen range hood exhaust fans shall be ducted to the outside. Exhaust fans shall not discharge near the air conditioning condensing unit, entry doors, patio or balconies, carports, or garages. Fans shall be tested and rated in accordance with AMCA 210, and shall operate with 120-volt, single-phase power supply. Exhaust fans shall be provided with backdraft damper. Bathroom exhaust fans shall be ceiling mounted and shall be sized to provide not less than 10 air changes per hour in the space served. Maximum allowable noise level for bathroom exhaust fans shall be 2 sones as installed. Kitchen range exhaust fans shall be two-speed, and shall be sized for an exhaust rate of 7.6 (L/s)/$m^2$ [1.5 cfm/ $ft^2$ ]. Maximum allowable noise level for range hood exhaust fans shall be 6 sones as installed.

10.h. Dryer Vents. A 100-mm [4-inch] diameter dryer vent shall discharge to the exterior, and provide connection to occupant-owned dryer (one dryer per vent). The vents shall be rigid aluminum with exterior wall cap and backdraft damper. Vent pipes shall be a maximum of 6100 mm [20 ft] long, with no more than three right angle elbows (with minimum radius of 150 mm [6 inches]), and have a maximum vertical run of 3660 mm [12 ft]. Dryer vents shall not exhaust near the air conditioning condensing unit, entry doors, patio or balconies, carports, or garages. Dryer vents shall not run through non-accessible spaces or garages.

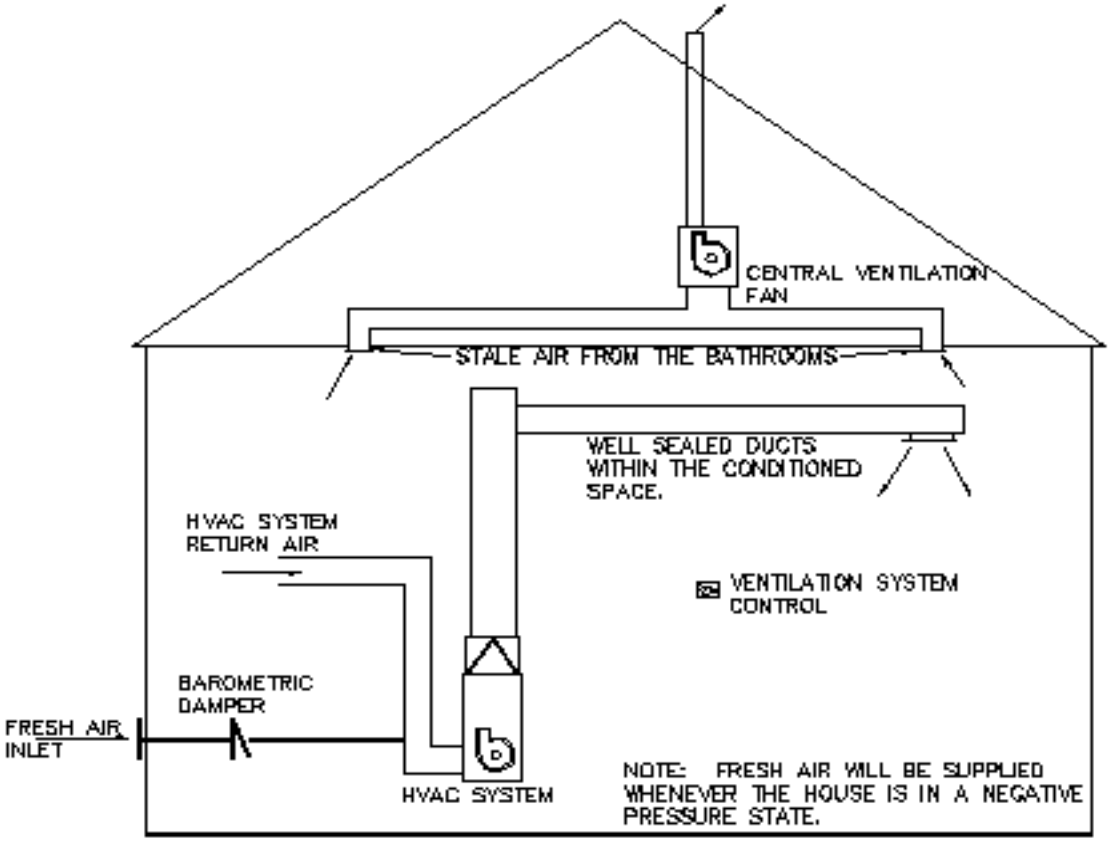
10.i. Humidification. [Use the requirements of this subparagraph to determine the allowable use of humidification. Humidification is optional. If not required, insert "... (Deleted)" following subparagraph letter and delete remainder of text. If humidification is required, edit this subparagraph to instruct the Contractor to provide humidification. Humidification shall be provided for all central forced air systems in areas having less than 1800 hours of 19.5 degrees C [67 degrees F] or higher wet bulb temperature in combination with annual heating degree days in excess of 1666 on an 18 degrees C base [3000 on a 65 degrees F base]. Humidifiers may be of the bypass or duct insertion type. Humidifiers shall be controlled by wall-mounted or return duct mounted humidistat. Humidification shall be allowed to a maximum of 30 percent relative humidity.]

10.j. Piping Requirements. Air conditioner condensate drains, refrigerant suction, and exterior refrigerant liquid lines shall be insulated with 25 mm [1 inch] (minimum) thick cellular glass or unicellular foam pipe insulation. (See subparagraph 10.f. for pipe insulation requirements in humid areas.) Exterior refrigerant line insulation shall be encased in either an aluminum or PVC jacket to prevent damage. Condensate lines shall be one size larger than the drain pan connection, be properly trapped, and not directly connected to a sanitary sewer system (air gap fitting required).

10.k. Ceiling Fans. [Ceiling fans are an optional feature which may be requested by the Installation. Delete paragraph if not required.] Provision of ceiling fans is encouraged as a means of increasing occupant comfort, and as an aid to improve the performance of heating and cooling systems. Ceiling fans with lights may be substituted for ceiling fixture requirements in bedrooms and in the dining room. Ceiling fans will be low profile 1050-1350 mm (42-52 inch), four blade type. Motors shall be three speed reversible, with air volume range between 613 and 2832 lps (1300 and 7000 CFM) and speeds between 75 and 225 rpm. Maximum power consumption shall be 80 Watts and 0.7 amps. Manufacturer's 20 year warranty is required.

10.m. Active Ventilation Engineered IAQ Enhancement. The bathroom exhausts, within each unit, shall all be ducted together to a common exhaust plenum equipped with a single long-life, low cfm, two-speed fan. The fan shall be sized to provide the required exhaust rate in each bathroom space when operated at low speed. Control for this fan shall be accomplished from a wall mounted switch, located in the linen closet, labeled HI-LOW-OFF. The OFF position of the switch shall illuminate a “RED” LED to indicate the off condition of the ventilation system. The supply ventilation portion of the system shall consist of a small duct providing a connection for fresh (outdoor air) air to the furnace return duct. This duct shall contain a barometrically-controlled vent which shall admit outdoor air to the unit whenever the housing unit is experiencing a negative pressure. ASHRAE 62-1989, “Ventilation for Acceptable Indoor Air Quality” recommends ventilation air supply rate at a minimum of 0.35 air changes per hour (ACH) but not less than 15 cfm per person. This is supplied by either natural infiltration or a combination of natural infiltration plus active ventilation. The fresh air supply duct shall be sized to provide no more than this minimum 0.35 Air Changes per hour maximum ventilation rate (but in no case shall the ventilation air introduced into the unit from the combination of natural infiltration and active ventilation be less than recommended by ASHRAE 62 with consideration for two (2) occupants per bedroom). This system is a recommended “Energy Star Homes” approach

for improving indoor air quality in residential construction. The Active Ventilation Engineered IAQ Enhancement described in this paragraph is considered to be a minimum level compliance item (See Diagram below.) in weather regions 5 through 11. In weather regions 1-4 extreme cold conditions and energy efficiency considerations may require the use of alternate approaches, some including heat recovery ventilators (HRV). Contractors are encouraged to present and propose other systems/methods which are enhancements/improvements to the system described and can ensure adequate fresh ventilation air (0.35 AC/Hr Max) is provided to the interior spaces of the housing units. Contractor are encouraged to review "Energy Star" materials and information available to them through the EPA and/or by visiting the Energy Star Web page. See, for example, http://yosemite.epa.gov/appd/eshomes/eshaware.nsf/attachments/lib/$file/BalancedVentSys.pdf and http://yosemite.epa.gov/appd/eshomes/eshaware.nsf/attachments/lib/$file/SupplyVent.pdf.




ACTIVE VENTILATION SYSTEM SCHEMATIC

10.m. Testing, Adjusting, and Balancing. Adjusting and balancing of each housing unit shall be the Contractor's responsibility. Following adjusting and balancing, testing of air and water systems shall be performed on 10 percent of the project buildings (not to exceed 10 buildings), which have been randomly selected by the Contracting Officer. If buildings are to be turned over in phases, testing shall be performed on 10 percent of the buildings completed in each phase (not to exceed 10 buildings per phase). No additional testing will be required if at least 90 percent of the tested buildings pass the test requirements. If less than 90 percent of the tested buildings pass the test, an additional 10 percent of the project buildings (not to exceed 10 buildings) shall be tested. This process shall continue until 90 percent of the total number of tested buildings pass. The contractor shall correct all housing units not found in compliance, and shall be responsible for all labor and materials required for this effort. AABC MN-1, NEBB-01, SMACNA-07 or ASHRAE 111 shall be used as the standard for providing testing of air and water systems. The selected standard shall be used throughout the project. Instrumentation accuracy shall be in accordance with the standard selected. Testing shall be accomplished by a firm certified for testing by the Associated Air Balance

Council (AABC) or National Environmental Balancing Bureau (NEBB). Prior to testing, adjusting, and balancing, the Contractor shall verify that the systems have been installed and are operating as specified. Where specific systems require special or additional procedures for testing, such procedures shall be in accordance with the standard selected. Approved detail drawings and all other data required for each system and/or component to be tested shall be made available at the job site during the entire testing effort. Testing shall not commence until approved by the Contracting Officer. The facility shall be essentially complete with final ceiling, walls, windows, doors, and partitions in place. Doors and windows surrounding each area to be balanced shall be closed during testing and balancing operations. Air systems, hydronic systems, and exhaust fans shall be complete and operable. All data, including deficiencies encountered and corrective action taken, shall be recorded. Following final acceptance of certified reports by the Contracting Officer, the setting of all HVAC adjustment devices shall be permanently marked by the Contractor's balancing engineer so that adjustment can be restored if disturbed at any time.

10.n. Duct Tightness Testing Requirements. The installation of the supply and return ductwork within the units is an item of prime concern with respect to the energy efficient operation of the housing unit as a whole. With that consideration in mind, for heating and air conditioning designs which include ductwork outside of the conditioned envelope, the contractor will be required to test the proto-type units and all units which are blower door tested for tightness (see paragraph 7.c.(2)) to ascertain the leakage levels from the ductwork in accordance with the following requirements. For system designs which place all the ductwork within the conditioned envelope of the structure or systems which utilize evaporative cooling, no ductwork testing will be required.

10.n.(1). Duct tightness testing shall ensure that the leakage rate from ductwork (where the ductwork system is not entirely within the conditioned envelop) shall not exceed 0.15 $(L/s)/m^2$ [0.03 $cfm/ft^2$]. If the units tested fail to meet this requirement, the ductwork installation shall be examined, corrections made, and the test redone until the installation passes this requirement. No ductwork systems may be installed in other units until the proto-type units ductwork systems have been validated. Several methods to accomplish this testing are acceptable

10.n.(1).(a). Testing may be done in accordance with ASTM Standard E 1554-94, “Determining External Air Leakage of Air Distribution Systems by Fan Pressurization”. This method describes the process and methodology required to accomplish basically a ‘blower door subtraction’ method of duct tightness testing.

10.n.(1).(b). Testing may also be accomplished utilizing “Duct Blaster” methodologies and pressurizing the ductwork to 25 Pascal [0.1 inch of water].

10.n.(2). The contractor is advised that the EPA may test, or hire a consultant to test randomly selected housing units constructed in this project. These tests will be completed without cost to the contractor, however, the contractor will be required to coordinate access to the selected unit. If accomplished, this testing is not expected to interfere or delay the construction contractor in any manner.

**11. ENERGY CONSERVATION.**

Energy conservation techniques shall be considered as they relate to site design, site engineering, unit design, and unit engineering. Techniques which conserve energy, improve livability, and can be justified by life cycle cost analysis as cost effective are encouraged. Integration of energy conservation systems with the housing unit's design (lighting, structure, mechanical systems, and aesthetics) is essential to facilitate livability and maximum energy savings. If an alternative energy generation method is intended for use as the project's primary energy source, documentation shall be submitted to the Contracting Officer, verifying the system's reliability and ability to meet the project's peak demand. The following paragraphs suggest energy conservation techniques which are considered desirable. The listing is not all inclusive, and the techniques suggested may not be cost effective at a given location or site. Additional consideration in the technical evaluation will be given to designs which incorporate valid energy conservation techniques.

11.a. Passive Solar Applications. Passive solar architectural applications shall routinely be considered as a part of all project designs. Unique applications such as attached sun spaces, earth sheltering, mass trombe walls, solar chimneys, solar dehumidifiers, and other innovations may be considered. Operational controls, such as shading and venting mechanisms, to control the amount of heat admitted into the housing unit during the day, reduce the amount of heat escaping from the housing unit at night, and provide for thermal comfort of the occupants, are parts of this system.

11.a.(1). Additional south glazing. If used as part of the solar energy system, glazing shall be of the commercially available off-the-shelf type and shall face within 15 degrees of solar south. The glazing shall be architecturally compatible with the housing unit and the environment, face directly into the living space so that the walls, floors, ceiling, and other massive objects can absorb the entering solar energy, and shall have a whole-window U value less than 1.6 square meter-kelvin (K)/watt [0.28 $ft^2$-degrees F/BTUH]. The optimum amounts of **solar glazing** that will admit enough solar energy are shown below:

| Average winter outdoor temperature | 36° lat | 40° lat | 44° lat | 48° lat |
|---|---|---|---|---|
| *Cold climates* | *GA/FA* | *GA/FA* | *GA/FA* | *GA/FA* |
| 20° | 0.24 | 0.25 | 0.29 | 0.31 |
| 25° | 0.22 | 0.23 | 0.25 | 0.28 |
| 30° | 0.19 | 0.20 | 0.22 | 0.24 |
| *Temperate climates* | *GA/FA* | *GA/FA* | *GA/FA* | *GA/FA* |
| 35° | 0.16 | 0.17 | 0.19 | 0.21 |
| 40° | 0.13 | 0.14 | 0.16 | 0.17 |
| 45° | 0.10 | 0.11 | 0.12 | 0.13 |

Table: Sizing South facing Glazing, GA/FA = glazing area/floor area

Note: Window area on the other sides of the house should total no more than 5% of the floor area.

10.a.(2). Storage mass. If thermal performance calculations indicate a need for additional mass (beyond that provided by the housing unit structure) substantiating data will be submitted. The storage mass will be well integrated into the housing unit design. The thermal mass surface area in the space must be a minimum of three times the glazing area. Six to nine times the glazing area is recommended to control temperature swings. The surfaces to absorb solar energy must not be more than 10% covered.

10.a.(3). Shading. Movable window treatments are required. These can take the form of heavy draperies to be drawn by the occupants at night and opened in the day. Movable thermal insulation is considered the optimum installation. Cooling season shading of glazed surfaces on the west and south elevations shall be considered.

10.b. Pre-engineered Active Solar Applications. Pre-engineered active solar applications proposed for domestic water heating shall be evaluated for life-cycle-cost effectiveness using a recognized process design program.

Whether site-mounted or unit-mounted, systems must be designed for maximum ease of maintenance and for architectural compatibility with the total family housing environment. Systems shall be designed to provide no more that 60 percent of the housing unit's annual water heating load.

10.c. Geothermal. Geothermal energy sources such as wet or dry steam sources, geothermal hot water, hot dry rock, etc., when determined cost effective, may be considered in regions with established geothermal sources. Each design utilizing geothermal sources shall address the project's environmental impact relating to discharge of hazardous, noncondensable gases or other hazardous effluents, noise emission, heat rejection, ground water contamination, land use, etc.

10.d. Wind. Wind power may be considered in regions where determined cost effective. Factors such as average wind speed, available wind power, and wind variability shall be considered when investigating the annual useful energy production potential.

10.e. Condenser Heat Recovery. In regions authorized for cooling, consideration shall be given to installation of a heat exchanger to recover condenser heat and desuperheat for use in heating domestic water. A standard, domestic water heater shall be provided in conjunction with this system to provide hot water during the heating season. Heat pump water heaters can be considered in hot climates.

10.f. Energy Recovery Ventilator. Energy recovery ventilators shall be considered for use with systems designed to introduce outside ventilation air into the housing unit to address indoor air quality concerns, particularly in extreme cold climates. The increased cost and system complication associated with the introduction of outside air shall be carefully weighed against severity of indoor air quality deficiencies before the decision is made to supply outside air at the air handler. When utilized, energy recovery ventilators shall pre-condition outside air by permitting energy transfer from exhaust air. Units shall have easily accessible controls and filters.

10.g. Systems and techniques which take advantage of rebates and incentives offered by utilities are preferred and shall be stated by the government and local utility districts.

**12. CONTRACTOR PREPARED SPECIFICATIONS**

12.a. The successful offeror shall prepare a specification for all work included in the scope of work. The specification shall be tailored to this job. Inapplicable materials shall be deleted. Any reference, description, procedure or other matter required to develop a complete, accurate and concise specification shall be provided. The specification shall include but is not limited to:

12.a.(1). A description of the technical requirements

12.a.(2). Criteria for determining whether the requirements are met

12.a.(3). Quality control requirements and procedures

12.b. Specifications for features of the work shall be organized into divisions and sections in accordance with Construction Specifications Institute (CSI), Master List of Titles and Numbers for the Construction Industry, latest edition.

12.c. Individual specification sections shall be in the format of CSI, Section Format, A Recommended Format for Construction Specification Sections, latest edition. Exceptions are:

12.c.(1). Measurement Procedures and Payment Procedures shall only be used in those section(s) where rock excavation is specified. No other sections shall contain these subparagraphs of the paragraph SUMMARY.

12.c.(2). Except as otherwise noted in this paragraph, CONTRACTOR PREPARED SPECIFICATIONS, the paragraph SUMMARY shall not be used.

12.c.(3). Submittal requirements, submittal procedures and quality control procedures, construction operations shall be those contained in the attached Section 01005, Section 01012, Section 01111, Section 1200, Section 1300, Section 1320, Section 01330, including the submittal register, Section 1440, Section 1451, Section 1500, Section 1560, and Section 1711. These specification sections shall be incorporated into the contractor prepared specification packages without editing and shall be coordinated with all other specification sections prepared by the contractor. [USACE Design District shall edit this paragraph as required to indicate the required "construction administration" type specifications required to provide Quality Assurance for this project. Full CEGS technical guide specifications should not be included.]

12.c.(4). Section 09990, Painting; shall establish a minimum level of quality for paints, stains, and varnishes to be used in this project.

12.d. Removal and disposal of asbestos shall be specified in its own section and numbered 13280. The attached section 13280 shall be reviewed, edited, and submitted by the Contractor's Industrial Hygienist during the design review process. Specification shall be edited to suit this particular project requirements as determined by the contractor's professional staff. [USACE Design District delete where no demolition activities are included in the project.]

12.e. Removal and disposal of lead based paint, shall be specified in its own section and numbered 13283. The attached section 13283 shall be reviewed, edited, and submitted by the Contractor's Industrial Hygienist during the design review process. Specification shall be edited to suit this particular project requirements as determined by the contractor's professional staff. [USACE Design District delete where no demolition activities are included in the project.]

12.f. Contractor prepared specifications shall be reviewed by the Contracting Officer or his designated representatives during the design portion of the project. Contractor will incorporate all required changes after resolution of comments and prior to work initiation on the next phase of the project.

**13. SUSTAINABLE DESIGN CONSIDERATIONS:**

13.a. Sustainable design techniques shall be considered as they relate to site design, site engineering, unit design, and unit engineering. Techniques which conserve energy, improve livability, and can be justified by life cycle cost analysis as cost effective are encouraged. Integration of energy conservation systems with the housing unit's design (lighting, structure, mechanical systems, and aesthetics) is essential to facilitate livability and maximum energy savings. The following paragraphs define the goals and general objectives for inclusion of sustainable design considerations in this project. This information is taken from US Army Corps of Engineers, ETL 1110-3-491. The listing is not all inclusive, and the techniques suggested may not be cost effective at a given location or site. Additional consideration in the technical evaluation will be given to designs which incorporate and identify Sustainable Design techniques included in the proposal.

13.b. Goals and Objectives of Sustainable Design.

13.b.(1). The overall USACE goal of Sustainable Design is to be environmentally responsible in the delivery of facilities. The key traditional elements for decision making in the facility delivery process are cost, quality and time. These elements need to be expanded to include the ecological and human health impacts of all decisions.

13.b.(2). Each project generates its own set of goals. However, sustainable design goals should apply to all projects. The goals for improving the environmental performance of facilities include: (a) use resources efficiently and minimize raw material resource consumption, including energy, water, land and materials, both during the construction process and throughout the life of the facility, (b) maximize resource reuse, while maintaining financial stewardship, (c) move away from fossil fuels towards renewable energy sources, (d) create a healthy and productive work environment for all who use the facility, (e) build facilities of long-term value, and (f) protect and, where appropriate, restore the natural environment.

13.c. Sustainable Design and Construction of the Built Environment. Design and construction of sustainable buildings should be in accordance with the following concepts:

13.c.(1). Site Work and Planning--Environmentally sensitive planning looks beyond the boundary of the project site to evaluate linkages to transportation and infrastructure, ecosystems and wildlife habitat and community identification. Site planning evaluates solar and wind orientation, local microclimate, drainage patterns, utilities and existing site features to develop optimal siting and appropriate low maintenance landscape plant material.

13.c.(2). Building Layout and Design--Optimize building size, and maintain an appropriate building scale for the environment and context of the building or a building component. Layout the rooms of a building for energy performance and comfort, and design for standard sizes to minimize material waste. Pay careful attention to the location of exterior windows. Avoid structural over-design and the resultant waste. Design components of the building environment for durability and for waste recycling.

13.c.(3). Energy--Building orientation and massing, natural ventilation, day-lighting, shading and other passive strategies, can all lower a building's energy demand and increase the quality of the interior environment and the comfort and productivity of occupants.

13.c.(4). Building Materials--Environmentally preferable building materials are durable and low maintenance. Within the parameters of performance, cost, aesthetics and availability, careful selection and specification can limit impacts on the environment and occupant health.

13.c.(5). Indoor Air Quality--Indoor air quality is most effectively controlled through close coordination of architecture, interiors and mechanical, plumbing, and electrical design strategies that limit sources of contamination before they enter the building. Construction procedures for IAQ and post-occupancy user guides also contribute to good long-term IAQ.

13.c.(6). Water Usage-- Site design strategies that maximize natural filtration of rainwater are desirable. Water conservation is enhanced by the use of low flow plumbing fixtures and water appropriate landscaping.

13.c.(7). Recycling and Waste Management--Waste and inefficiency can be limited during construction by sorting and recycling demolition and construction waste, reuse of on-site materials and monitoring of material use and

packaging. Accommodating recycling into building design reduces waste while generating revenues.

13.c.(8). Building Commissioning, Operations and Management--Effective building commissioning is essential to ensure proper and efficient functioning of systems. Facilities operations benefit from energy and water saving practices, waste reduction and environmentally sensitive maintenance and procurement policies.

**LIST OF ATTACHMENTS TO THE STATEMENT OF WORK**

| NUMBER | DESCRIPTION |
|---|---|
| 1. | TECHNICAL SPECIFICATIONS |
| 2. | OUTLINE SPECIFICATIONS |
| 3. | FORMAT FOR REQUIRED AREA CALCULATIONS |
| 4. | PROPOSAL DATA SHEETS |
| 5. | PROPOSAL DRAWING FORMAT |
| 6. | SITE AND LOCALITY MAPS |
| 7. | PROJECT AND SAFETY SIGNS |
| 8. | GEOTECHNICAL REPORT |
| 9. | EXCERPTS FROM THE INSTALLATION DESIGN GUIDE |
| 10. | FIRE FLOW DATA |
| 11. | LIST OF DRAWINGS |
| 12. | ASBESTOS AND LEAD PAINT SURVEY RESULTS |

# ATTACHMENT 1

# TECHNICAL SPECIFICATIONS

**ATTACHMENT 1**

**TECHNICAL SPECIFICATIONS**

**GUIDE SPECIFICATIONS MODIFIED FOR DESIGN-BUILD CONSTRUCTION CONTRACTS:**

Several Guide Specifications, covering contract procedures and execution issues must be modified for design-build construction contracts to reflect the integrated design and construction aspects, as well as the non-traditional roles and responsibilities of the parties. Some of these modified Specifications have been included herein. In addition, we have included a sample Section 01012 "DESIGN AFTER AWARD" modified to suit a family housing construction project.

**SUBMITTALS (SECTION 01330)**

Design submittals are covered in Division 01 General Requirements, Section 01012 "DESIGN AFTER AWARD". Construction submittal requirements are addressed in, Section 01330, "SUBMITTAL REQUIREMENTS". In design-build contracts, design and construction submittals are generally reviewed for conformance to the contract requirements. They are NOT routinely "reviewed for approval". The only time review for approval is necessary is for totally prescriptive specialty designs for which the Government desires to assume design responsibility. The requirement for approval should be determined during the development of the D-B RFP. The design-build project team needs to be explicit as to what needs Government approval and why the approval is necessary. The team also needs to be explicit as to what needs Government review and that the review is to ensure conformance to the contract requirements. The primary principle to remember is that if the Government chooses to approve the submittal, they may be taking some responsibility from the Contractor on design issues. One of the main advantages of D-B is the single point of responsibility for both design and construction. The Government shifts the risk of design adequacy to the D-B by avoiding assumption of the traditional role of "approval" of design and construction products to the maximum extent possible.

Section 01330 makes the D-B Contractor's Designer(s) of Record responsible for assuring the adequacy and integration of the design, including written approval for all extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked. The Government must concur with deviations to the completed design and must approve deviations to the accepted proposal and RFP; the latter are considered formal "changes", unless inconsequential in scope and cost

This attachment provides the location for the placement of the "font end" type specifications which are used to control contractor overall operations and represent the standards of operation and communication between the Corps Construction District and the contractor.

These specifications are to be listed in the Statement of Work, paragraph 12, CONTRACTOR PREPARED SPECIFICATIONS. The specifications included here should represent the minimum information necessary for the construction Area Office to adequately administer the contract, it is not the intention of this attachment to include material specific technical specifications from the Corps of Engineers Guide Specifications (CEGS) or other similar sources.

Below is a list of specifications which could typically be included in this attachment.

| | |
|---|---|
| Section 01005 | Special Work Requirements and Restrictions |
| Section 01012 | Design After Award (Design/Build)** |
| Section 01111 | Safety and Health Requirements |
| Section 01200 | Project Meetings |
| Section 01300 | Submittal Procedures |
| Section 01320 | Project Schedule (Design/Build)** |
| Section 01330 | Submittal Procedures (Design/Build)** |
| Section 01451 | Contractor Quality Control (Design/Build)** |
| Section 01500 | Temporary Construction Facilities |
| Section 01560 | Environmental Protection |
| Section 01711 | As-Built Record Drawings and Shop Drawings - Contractor Prepared |
| Section 09900 | Painting, General |
| Section 13280 | Asbestos Abatement |
| Section 13283 | Removal and Disposal of Lead-Contaminated Paint |

*** Sample specifications edited to suit the design build procurement strategy are included in this TI for editing and use by Design Districts.*

# SECTION 01012
# DESIGN AFTER AWARD

[*Design Districts shall review and edit this specification as necessary to suit the project.]*

## 1.0 GENERAL

The Contractor shall propose a schedule for the number and composition of the design submittal phases. As a minimum, design submittals are required at the preliminary (50%) and final (100%) design stages and at the design complete stage. The requirements of each design stage are listed hereinafter. The Contractor shall reflect the number and schedules for the design submittals phases in the progress charts.

## 2.0 DESIGNER OF RECORD

The Contractor shall identify, for approval, the Designer of Record for each area of work. One Designer of Record may be responsible for more than one area. All areas of design disciplines shall be accounted for by a listed, registered Designer of Record. The Designer(s) of Record shall stamp, sign, and date all design drawings under their responsible discipline at each design submittal stage (see SCR - "Registration of Designers" ).

## 3.0 STAGES OF DESIGN SUBMITTALS

3.1 First Site/Utility Design Submittal (100%). This submittal is provided to allow the contractor to concentrate initial efforts for the site/utility portions of the project. By allowing this work to be separated, the contractor is given the opportunity to fast track and begin construction on the site/utility work prior to completion of the building designs. This submittal shall consist of the following:

3.1.1 Design analysis, developed to 100%

3.1.2 100% complete drawings

3.1.3 Final site/utility specifications

3.1.4 Environmental permits, as required. When environmental permits are not required, the Contractor shall provide a statement with justification to that effect.

3.2 First Building Design Submittal (50%). This submittal is intended to insure that the contractors design is proceeding in accordance with the terms of the solicitation and the contractor's original proposal as well as in a timely manner. This submittal shall consist of the following:

3.2.1 Design analysis, developed to 50%

3.2.2 50% complete drawings

3.2.3 Draft specifications

3.3 Final Building Design Submittal (100%). The review of this submittal is to insure that the design is in accordance with directions provided the Contractor during the design process as well as the original

solicitation and the contractor's proposal. The Contractor shall submit the following documents for Final Design Review:

3.3.1. 50% review comments and responses

3.3.2 The Design Analysis submitted for Final Design Review shall be in its final form. The Design Analysis shall include all backup material previously submitted and revised as necessary. All design calculations shall be included. The Design Analysis shall contain all explanatory material giving the design rationale for any design decisions which would not be obvious to an engineer reviewing the Final Drawings and Specifications.

3.3.3 The Contract Drawings submitted for Final Design Review shall include the drawings previously submitted which have been revised and completed as necessary. The Contractor is expected to have completed all of his coordination checks and have the drawings in a design complete condition. The drawings shall be complete at this time including the incorporation of any design review comments generated by the previous design reviews. The drawings shall contain all the details necessary to assure a clear understanding of the work throughout construction. Shop drawings will not be considered as design drawings. All design shall be shown on design drawings prior to submittal of shop drawings.

3.3.4 The Draft Specifications on all items of work submitted for Final Design Review shall consist of legible marked-up specification sections.

3.3 Design Complete Submittal. After the Final Design Review, the Contractor shall revise the Contract Documents by incorporating any comments generated during the Final Design Review and shall prepare final hard copy Contract Specifications. The Contractor shall submit the following documents for the design complete submittal:

3.3.1 Design analysis, in final 100% complete form

3.3.2 100% complete drawings

3.3.3 Final specifications

3.3.4 Annotated 100% review comments

3.3.5 CADD files of all drawings (2 copies)

## 4.0 FAST TRACK CONSTRUCTION START

The Contractor may begin construction on portions of the work for which the Government has reviewed and determined satisfactory for purposes of beginning construction. The ACO or COR will issue a construction NTP to the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

## 5.0 QUANTITY OF DESIGN SUBMITTALS

5.1 General. The documents which the Contractor shall submit to the Government for each submittal are listed and generally described hereinafter.

DISTRIBUTION

| Activity and Address | Drawings Size AO [Full] | Drawing Size A2 [Half] | Color Boards ** |
|---|---|---|---|
| Commander,<br>U.S. Army Engineer District, | * | * | * |
| Commander, Installation | * | * | * |
| U.S. Army Corps of Engineers<br>Construction Area Office | * | * | * |
| Installation Major Command | * | * | |

*USACE Design District to complete required quantities based on project requirements.

** Color boards shall be submitted with the 100% building submittal only.

**6.0 MAILING OF DESIGN SUBMITTALS**

6.1 Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Govenment will furnish the Contractor addresses where each copy shall be mailed to after award of the contract. The submittals shall be mailed to four (4) different addresses.

6.2 Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

**7.0 COORDINATION**

7.1 Written Records. The Contractor shall prepare a written record of each design site visit, meeting, or conference, either telephonic or personal, and furnish within five (5) working days copies to the Contracting Officer and all parties involved. The written record shall include subject, names of participants, outline of discussion, and recommendation or conclusions. Number each written record for the particular project under design in consecutive order.

7.2 Design Needs List. Throughout the life of his contract the Contractor shall furnish the COR a monthly "needs" list for design related items. This list shall itemize in an orderly fashion design data required by the Contractor to advance the design in a timely manner. Each list shall include a sequence number, description of action item, name of the individual or agency responsible for satisfying the action item and remarks. The list will be maintained on a continuous basis with satisfied action items checked off and new action items added as required. Once a request for information is initiated, that item shall remain on the list until the requested information has been furnished or otherwise resolved. Copies of the list will be mailed to both the Administrative Contracting Officer and the agencies tasked with supplying the information.

**8.0 GOVERNMENT REVIEW**

8.1 Within 21 days after Notice to Proceed, the Contractor shall submit, for approval, a complete design schedule with all submittals and review times indicated in calendar dates. The Contractor shall update this schedule monthly. Design schedule indicates minimum design submission requirements and does not preclude other submittals (i.e., utility, foundation, framing, etc.) in efforts to expedite construction.

COMPLETION SCHEDULE

| Item of Work | Calendar Days from Notice to Proceed |
|---|---|
| Submit 50% completed building design including design analysis, drawings and specifications and 100% utility design. | 60 |
| Submit 100% complete design including revised design analysis, drawings and specifications. | 100 |
| Complete all design work. Delay in completion of design will not be considered as a valid reason to delay completion of entire work. | 135 |

8.2 After receipt, the Government will be allowed fourteen (14) days to review and comment on each design submittal. For each design review submittal, the COR will furnish, to the Contractor, a single consolidated listing of all comments from the various design sections and from other concerned agencies involved in the review process. The review will be for conformance with the technical requirements of the solicitation and the Successful Offeror's (Contractor's) RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. The Contractor shall furnish disposition of all comments, in writing, with the next scheduled submittal. The Contractor is cautioned in that if he believes the action required by any comment exceeds the requirements of this contract, that he should take no action and notify the COR in writing immediately. Review conferences will be held for each design submittal at (NAME OF BASE). The Contractor shall bring the personnel that developed the design submittal to the review conference. These conferences will take place the week after the receipt of the comments by the Contractor.

8.3 If a design submittal is over one (1) day late in accordance with the latest design schedule, the Government review period will be extended 7 days. Submittals date revisions must be made in writing at least one (1) week prior to the effect submittal.

8.4 Post review conference action: Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Valid comments will be incorporated. After receipt of final corrected design documents upon incorporation of backcheck comments the [USACE Design District] will recommend issuance of a Construction Notice to Proceed (NTP). The Government, however, reserves the right to disapprove design document submittals if comments are significant. If final or backcheck submittal(s) are incomplete or deficient, and require correction by the Contractor and resubmittal for review, the cost of rehandling and reviewing will be deducted from payment due the Contractor at the rate of $1,500.00 per submittal.

## 9.0 DESIGN ANALYSIS

8.1 Media and Format. Present the design analysis on 8-1/2-inch by 11-inch paper except that larger sheets may be used when required for graphs or other special calculation forms. All sheets shall be in reproducible form. The material may be typewritten, handlettered, handwritten, or a combination thereof, provided it is legible. Side margins shall be 1-inch minimum to permit side binding and head to head printing. Bottom margins shall be 1-1/4-inches, with page numbers centered 1 inch from the bottom.

9.2 Organization. Assign the several parts and sheets of the design analysis a sequential binding number and bind them under a cover indicating the name of the facility and project number, if applicable. The title page shall carry the designation of the submittal being made. The complete design analysis presented for final review with the final drawings and specifications shall carry the designation "FINAL DESIGN ANALYSIS" on the title page.

9.3 Design Calculations. Design calculations are a part of the design analysis. When they are voluminous, bind them separately from the narrative part of the design analysis. Present the design calculations in a clean and legible form incorporating a title page and index for each volume. Furnish a table of contents, which shall be an index of the indices, when there is more than one volume. Identify the source of loading conditions, supplementary sketches, graphs, formulae, and references. Explain all assumptions and conclusions. Calculation sheets shall carry the names or initials of the author and the checker and the dates of calculations and checking. No portion of the calculations shall be computed and checked by the same person.

9.4 Automatic Data Processing Systems (ADPS). When ADPS are used to perform design calculations, the design analysis shall include descriptions of the computer programs used and copies of the ADPS input data and output summaries. When the computer output is large, it may be divided into volumes at logical division points. Precede each set of computer printouts by an index and by a description of the computation performed. If several sets of computations are submitted, they shall be accompanied by a general table of contents in addition to the individual indices. Preparation of the description which must accompany each set of ADPS printouts shall include the following:

1. Explain the design method, including assumptions, theories, and formulae.
2. Include applicable diagrams, adequately identified.
3. State exactly the computation performed by the computer.
4. Provide all necessary explanations of the computer printout format, symbols, and abbreviations.
5. Use adequate and consistent notation.
6. Provide sufficient information to permit manual checks of the results.

## 10.0 DRAWINGS

10.1 Prepare all drawings on Computer-Aided Design and Drafting (CADD) so that they are well-arranged and placed for ready reference and so that they present complete information. The Contractor shall prepare the drawings with the expectation that the Corps of Engineers, in the role of supervision, will be able to construct the facility without any additional assistance from the Contractor. Drawings shall be complete, unnecessary work such as duplicate views, notes and lettering, and repetition of details shall not be permitted. Do not show standard details not applicable to the project, and minimize unnecessary wasted space. Do not include details of standard products or items which are adequately covered by specifications on the drawings. Detail the drawings such that conformance with the RFP can be checked and to the extent that shop drawings can be checked. Do not use shop drawings as design drawings. The design documents shall consist of drawings on a 36" x 24" format. The Contractor shall use standard Corps of Engineers title blocks and borders on all drawings. Submit an index of drawings with each submittal. The COR will furnish the Contractor file, drawing and specification numbers for inclusion in the

title blocks of the drawings.

10.2 Create all drawings using CADD methods in MicroStation or AutoCAD format. Save all Design Complete CADD files as MicroStation 5.0 and AutoCAD R14. The Contractor shall use EM 1110-1-1807 Standards Manual for U.S. Army Corps of Engineers Computer-Aided Design and Drafting (CADD) Systems as guidance to for standard details, cell libraries, title blocks, and layer/level assignments. Drawing features not addressed in EM 1110-1-1807 shall conform to drafting standards.

10.3 Only standard fonts provided by MicroStation or AutoCAD are allowed to be used in the creation of CADD files. No fonts created by third parties or the designer are permitted.

10.4 The uses of Reference files and Xrefs during the design stage is up to the discretion of the designers. All CADD files at Design Complete submittal shall be free standing, independent files, and not supported by reference files. All Reference files (MicroStation) and all Xrefs files (AutoCAD) shall be removed at Design Complete submittal.

10.6 Submit all Design Complete CADD files on one of the following media.

- Read/Write CD-ROM Disk

**11.0 SPECIFICATIONS**

11.1 The Contractor shall submit marked-up and final specifications as required. The specifications may be any one of the major, well known master guide specification sources such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Corps of Engineers Guide Specifications, etc. Use only one source for the project. Edit the specifications for this project and submit in marked-up or redlined draft version at the Final Review submittal stage. If the design is based on a specific product, the specification shall consist of the important features of the product. The specification shall be detailed enough such that another product meeting the specification could be substituted and it would not adversely impact the project. After incorporation of comments, submit a final, design complete specification package. Delete all marked-out or redlined text and type in all inserted text.

11.2 Submittal Register. Develop the submittal requirements during construction during the design phase of the contract, by producing a Contractor Submittal Register during design. Attach a submittal register to each section of the specifications for the submittal requirements of that section. Prepare the Submittal Register on ENG Form 4288. The Contractor shall be responsible for listing all required submittals necessary to insure the project requirements are complied with. The Register shall identify submittal items such as shop drawings, manufacturer's literature, certificates of compliance, material samples, guarantees, test results, etc that the Contractor shall submit for review and/or approval action during the life of the construction contract. The Contractor shall place all the Submittal Register pages in an appendix of the final specifications.

**12.0 CONTENTS OF DESIGN SUBMITTALS**

12.1 The 100% site/utility design submittal shall contain as a minimum, the following:

12.1.1 All drawings included in the required technical data for the proposal submission (see SECTION 00110: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS), shall be developed to 100 percent completion. In addition to the individual utility plans, submit a combined utility plan drawn to the same scale as the individual utility plans.

12.1.2 General Site Layout: Scale shall be as indicated in SECTION 00110: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS.

12.1.3 Site Grading and Drainage Plans: Show locations of all sediment basins, diversion ditches, and other erosion control structures. Indicate the approximate drainage areas each will service. Indicate the materials, construction and capacity of each structure. Include limits of landscaping and seeded areas. General site grading and drainage shall be indicated by contour lines with an interval of not more than approximately 1 m [3 feet].

12.1.4 Road Alignment Plans: Scale shall be no greater than as indicated in SECTION 00110: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS and profiles showing pavement and shoulder widths, azimuths and curve data, limits of grading, and erosion control. The materials to be used shall be indicated.

12.1.5 Traffic Control Plan: Traffic routing and signage shall be in accordance with The Manual **on** Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highways Administration.

12.1.6 Sanitary Sewer Plan: Scale shall be as indicated in SECTION 00110: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS and profiles showing location and elevation of pipe, thrust blocks, manholes, etc. Materials and construction of main and appurtenances shall be indicated. Specifications shall be provided.

12.1.7 Water Supply Line Plans: Scale shall be as indicated in SECTION 00110: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS and profiles showing locations of valves, thrust blocks, connections, etc. Materials shall be indicated and specifications shall be provided for valves, pipes, etc.

12.1.8 Electrical Plan Requirements:

12.1.8.1 Required diagrams and details on Site Electrical Drawings.

a. Off-Site Electrical Distribution Plan:
b. Off-Site Primary Circuit Routing Plans:
c. Off-Site One Line Diagram. (If applicable)
d. Off-Site Details. (Aerial Pole Line Construction, etc.) (If applicable).
e. On-Site Electrical Distribution Plan:
f. On-Site One Line Diagram.
g. On-Site Distribution Transformer Schedule: Provide with the following headings:
Transformer Designation. Transformer Size (KVA). Building(s) Served.
Primary Phase(s) and Circuit to which connected.
h. On-Site Details (Site Lighting, Trenching, Pad-Mounted Transformer, etc.).

12.1.9 Specifications: Provide final draft specifications which include all sections which apply to site/utility work.

12.1.10 Design Analysis: Design analysis shall include design calculations fully developed to support the design of the site and utility systems included in this submittal.

12.1.11 Geotechnical: Soils analysis and geotechnical report.

12.2 The 50% building design submittals shall contain as a minimum, the following:

12.2.1 Drawings: All buildings drawings included in the required technical data for the proposal submission SECTION 00110: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS, shall

be developed to approximately 50 percent completion. Drawings shall indicate the design or test number upon which the fire and sound rated separations are based.

12.2.2 Specifications: Draft of specifications for housing units, including index and trade sections.

12.2.3 Design Analysis: Design analysis shall include design calculations developed to the extent required to support the design of that portion of structural, including seismic, electrical and mechanical systems included in this submittal.

12.3 THE 100% BUILDING DESIGN SUBMITTALS shall contain, as a minimum, the following items for all submittals:

12.3.1 All drawings included in the required technical data for the proposal submission (see SECTION 00110: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS), and the 50 percent complete buildings design, shall be developed to 100 percent completion. Furnish mechanical and electrical plans, with complete schematics, to show all air conditioning, plumbing and electrical work.

12.3.2 Show the construction of fire and sound rated assemblies in detail and note on the drawings the tested design upon which the construction is based. Note any modification to materials or method of construction. Detail all penetrations of rated partitions.

12.3.3 All details shall be referenced to floor plans, elevations or sections.

12.3.4 Kitchen cabinet elevations shall note cabinet sizes.

12.3.5 Building Transverse and Longitudinal Sections.

12.3.6 Details: Provide details as required to support the design.

12.3.7 Specifications: Provide final specifications for housing units. The Contractor shall make final identification of all materials and finishes at this stage.

12.3.8 Design Analysis: Complete housing unit design calculations for structural elements and electrical and mechanical systems. Include computations for framing member sizing, sizing PM&E equipment, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation (e.g., TRNSYS, DOE 2.1 Blast, etc.) is recommended. These calculations can be used to size the unit's mechanical systems. Based on the results of calculations, provide a complete list of the materials and equipment proposed for heating and plumbing, with the manufacturer's published cataloged product installation specifications and roughing-in data. The heating equipment data shall include the manufacturer's wiring diagrams, installation specifications, ARI certification, and the standard warranty for the equipment. Additional electrical requirements are indicated below.

12.3.9 Specific Mechanical and Plumbing Requirements:

12.3.9.1 Required Plans, Diagrams, Schedules and Details on Unit Mechanical Drawings (100% Unit Design Stages):

a. Mechanical Floor Plan: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:

Room designations.
Mechanical legend and applicable notes.

Location of all ductwork or piping (double line ductwork required).
Location and capacity of all terminal units (i.e., registers, diffusers, grilles, hydronic baseboards). Exhaust fan and range hood location.
Size of all ductwork and piping.
Thermostat location.
Location of heating/cooling plant (i.e., furnace, condensing units, etc). Return air paths (i.e., undercut doors, transfer grilles).
Flue piping size and location.
Piping diagram for forced hot water system (if used).
Fuel supply and return piping

b. Equipment Schedule Slice: Complete equipment Schedules shall be provided. Schedule shall also include:

Capacity
Electrical characteristics
Efficiency (if applicable)
Manufacturer's name
Optional features to be provided
Physical size

c. Details: Construction details, sections, elevations, etc., shall be provided where required for clarification of methods and materials of design. Roof and exterior wall penetrations shall be detailed on the drawings.

12.3.9.2 Plumbing Floor Plan: The floor plan shall show all principal architectural features of the building which will affect the plumbing design. Separate plumbing plans will not be required if sufficient information can be shown on the mechanical plans to meet the requirements shown above. The floor plan shall also show the following:

Room designations.
Fixture Schedule.
Location of utility entrances.
Waste and water pipe location and size.
Fixture designations.

12.3.10 Specific Electrical Requirements:

12.3.10.1 Required Plans, Diagrams, Schedules, and Details on Unit Electrical Drawings:

a. Electrical Floor Plan. The floor plans shall show all principle architectural features of the building which will affect the electrical design. The floor plan shall also show the following:

Room designations.
Electrical legend and applicable notes.
Lighting fixtures, properly identified.
Location of smoke and CO detectors.
Location of telephone and cable TV outlets.
Switches for control of lighting.
Receptacles.
Location and designation of panelboards. Plans should clearly indicate type of mounting required (flush or surface) and be reflected accordingly in specifications. Service entrance (conduit and main disconnect).
Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment.

Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.

b. Building Riser Diagram (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.

c. Unit Load Center Panelboard Schedule(s): Schedule shall indicate the following information:

Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.
Branch Circuit Designations.
Load Designations.
Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
Branch Circuit Connected Loads (AMPS).
Special Features.

d. Lighting Fixture Schedule: (Schedule shall indicate the following information:)

Fixture Designation.
General Fixture Description.
Number and Type of Lamp(s).
Type of Mounting.
Special Features.

e. Details: Construction details, sections, elevations, etc., shall be provided where required for clarification of methods and materials of design.

f. Required Electrical Design Analysis: Design analysis and calculations for the electrical systems shall be prepared by a licensed professional engineer with experience in family housing, and shall be stamped as such. The design analysis shall be separately bound, in one or more volumes. Show functional and engineering criteria, design information, and calculations applicable to the project. The analysis shall be organized in a format appropriate for review, approval, and record purposes. The design calculations shall indicate methods and references identified, and shall explain assumptions and conclusions.

g. Load Calculations: Provide a separate demand load calculation shall be provided for each type of individual living-unit (per NEC Art. 220).

h. Voltage Drop (VD) Calculations: Select conductor sizes of primary feeders, site lighting circuits, service laterals, and unit feeder conductors. Calculate maximum length for each phase of each primary circuit, using a maximum allowable VD for each circuit. Calculate voltage drops for each conductor. Maximum allowable voltage drop for site lighting and service laterals is 3%. The combined voltage drop for the service laterals, unit feeders, and branch circuit cannot exceed 5%. Calculate the available fault current at the main breaker for the living unit panel. Provide a coordination study to support breaker selection.

## 13.0 DESIGN RELATED PRODUCTS

13.1 Architectural Renderings: Contractor shall provide the original and three copies of each two, three, and four, bedroom unit, ground level perspective artist's renderings of completed typical housing with walks, parking, and landscaping. Renderings shall be no smaller than 14" x 18" or larger than 28" x 36", multi-colored, and shall be suitably titled, matted, and framed.

13.2 Color Samples: Provide three (3) sets of samples of colors showing color and pattern of

materials prepared for interior and exterior finish materials, including floor, wall and ceiling finishes, roofing, siding, and trim. Submit to Contracting Officer on size A4 [or 8-1/2" x 11"] sample boards.

13.3 DD Form 1354: Three (3) sets of DD Form 1354, Transfer and Acceptance of Military Real Property shall be prepared in accordance with ER 415-345-38 and submitted to the Contracting Officer. Copies of Form 1354 and ER 415-345-38 will be furnished to the successful contractor following award of the project.

13.4 Submittal Register, ENG FORM 4288: The Contractor shall complete and submit three (03) copies of a "preliminary" Eng Form 4288, Submittal Register to Contracting Officer. The "preliminary" Eng Form 4288, Submittal Register shall have the column "Submittal Identification", "Specification Paragraph Number", "Description of Submittal" "Type of Submittal", and "Remarks" completed; the Contractor shall identify whether the submittal is for "Government Approval" or for "Government Information" under the column "Remarks." The "final" Eng Form 4288, Submittal Register, shall be in accordance with clause CONTRACTOR SUBMITTALS AND SUBMITTAL CONTROL in this section.

13.5 Consumer Information for Handicapped Requirements: The Contractor shall furnish a report including drawings in accordance with the Uniform Federal Accessibility Standards, paragraph 4.34.4 "Consumer Information" for the modified and adaptable features of each unit type of family housing.

13.6 Reproduction: Upon Government approval of 100% design documents, the original will be returned to the Contractor for reproduction purposes. The Contractor will be responsible for his own reproduction as well as reproduction for Government use. The Government will require twice the number of copies of the plans and specifications as were required for the review stages, no color boards will be required. The originals will be retained by the Contractor for recording of as-built conditions. Upon completion of the project, the original design documents corrected to reflect as-built conditions will be supplied to the Government.

# SECTION 01320
# PROJECT SCHEDULE
# DESIGN-BUILD CONSTRUCTION

[*Design Districts shall review and edit this specification as necessary to suit the project.]*

## 1. GENERAL

### 1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

**SD-07 Schedules**

Initial Project Schedule; GA;

Preliminary Project Schedule; GA;

Periodic Schedule Updates; GA;

[Three][_____]copies of the schedules showing codes, values, categories, numbers, items, etc., as required.

**SD-08 Statements**

Qualifications; FIO;

Documentation showing qualifications of personnel preparing schedule reports.

**SD-09 Reports**

Narrative Report; FIO;

Schedule Reports; FIO;

[Three] [_____] copies of the reports showing numbers, descriptions, dates, float, starts, finishes, durations, sequences, etc., as required.

### 1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports. This person shall have previously created and reviewed computerized schedules. Qualifications of this individual shall be submitted to the Contracting Officer's Representative for review with the Preliminary Project Schedule submission.

## 2. PRODUCTS (Not Applicable)

## 3. EXECUTION

### 3.1 GENERAL

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS a Project Schedule as described below shall be prepared. The Contractor shall be responsible for scheduling of all design, procurement and construction activities. Contractor management personnel shall actively participate in its development. Designers. subcontractors and suppliers working on the project should also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

### 3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel shall result in an inability of the Contracting Officer's Representative to evaluate Contractor progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer's Representative to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer's Representative and those revisions have not been included in the Project Schedule, then the Contracting Officer's Representative may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

### 3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer's Representative.

#### 3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

#### 3.3.2 Level of Detail Required

With the exception of the initial and preliminary schedule submission, the Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer's Representative at the appropriate level of detail, as specified by the Contracting Officer's Representative, shall result in the disapproval of the schedule. The Contracting Officer's Representative will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule.

##### 3.3.2.1 Activity Durations

Contractor submissions shall be required to follow the direction of the Contracting Officer's Representative regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods. A rule of thumb, that the Contractor should use, is that less than 2 percent of all non-procurement activities' Original Durations shall be greater than 20 days.

##### 3.3.2.2 Design and Permit Activities

The Contractor shall integrate design and permitting activities, including necessary conferences and

follow-up actions and design package submission dates into the schedule.

#### 3.3.2.3 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing.

#### 3.3.2.4 Government Activities

Government and other agencies activities that could impact progress shall be shown. These activities include, but are not limited to: design reviews, submittal reviews, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and notice to proceed for phasing requirements.

#### 3.3.2.5 Workers Per Day

All activities shall have an estimate of the average number of workers per day that are expected to be used during the execution of the activity. If no workers are required for an activity, in the case of activities related to procurement, for example, then the activity shall be identified as using zero workers per day. The workers per day information for each activity shall be identified by the Workers Per Day Code.

#### 3.3.2.6 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

#### 3.3.2.7 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

#### 3.3.2.8 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number.

#### 3.3.2.9 Bid Item

All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

#### 3.3.2.10 Phase of Work

All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not be allowed to contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

**3.3.2.11 Category of Work**

All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited to, the procurement chain of activities including such items as submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

**3.3.2.12 Feature of Work**

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

**3.3.3 Scheduled Project Completion**

The schedule interval shall extend from notice-to-proceed to the contract completion date.

**3.3.3.1 Project Start Date**

The schedule shall start no earlier than the date that the Notice to Proceed (NTP) was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have: a "ES" constraint, a constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

**3.3.3.2 Constraint of Last Activity**

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity call "End Project". The "End Project" activity shall have: a "LF" constraint, a constraint date equal to the completion date for the project, and a zero day duration.

**3.3.3.3 Early Project Completion**

In the event the project schedule shows completion, the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted at every project schedule update period to assist the Contracting Officer's Representative to evaluate the Contractor's ability to actually complete prior to the contract period.

**3.3.4 Interim Completion Dates**

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

**3.3.4.1 Start Phase**

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have: a "ES" constraint, a constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

**3.3.4.2 End Phase**

The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have: a "LF" constraint, a constraint date

equal to the completion date for the project, and a zero day duration.

#### 3.3.4.3 Phase X

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X:" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

### 3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in progress or completed activity and insure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer's Representative to evaluate Contractor progress for payment purposes.

### 3.3.6 Out-of-Sequence Progress

Activities that have posted progress without predecessors being completed (Out-of-Sequence Progress) shall be allowed only by the case-by-case approval of the Contracting Officer's Representative. The Contracting Officer's Representative may direct that changes in schedule logic be made to correct any or all out-of-sequence work.

### 3.3.7 Extended Non-Work Periods

Designation of Holidays to account for non-work periods of over [5] [_____] days shall not be allowed. Non-work periods of over [5] [_____] days shall be identified by addition of activities that represent the delays. Modifications to the logic of the project schedule shall be made to link those activities that may have been impacted by the delays to the newly added delay activities.

### 3.3.8 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

## 3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

### 3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first [60] [_____] calendar days shall be submitted for approval within [20] [_____] calendar days after Notice to Proceed is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed [60] [_____] calendar days after Notice to Proceed.

### 3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within [40] [_____] calendar days after Notice to Proceed. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

### 3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer's Representative or to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer's Representative or authorized representative, is necessary for verifying the contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

### 3.4.4 Standard Activity Coding Dictionary

The Contractor shall submit, with the Initial Project Schedule, a coding scheme that shall be used throughout the project for all activity codes contained in the schedule. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. For example, a Responsibility Code Value, "ELE", may be identified as "Electrical Subcontractor." Activity code values shall represent the same information throughout the duration of the contract. Once approved with the Initial Project Schedule submission, changes to the activity coding scheme must be approved by the Contracting Officer's Representative.

## 3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the initial submission, and every periodic project schedule update throughout the life of the project:

### 3.5.1 Data Disks

[Three] [_____] data disks containing the project schedule shall be provided. Data on the disks shall be in the format specified in [_____].

#### 3.5.1.1 File Medium

Required data shall be submitted on [3.5] [_____] disks, formatted to hold [1.44 MB] [_____] of data, under the [WINDOWS] [_____] operating system or on a WINDOWS formatted CD-ROM disk.

#### 3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the software version format of the disk.

#### 3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will insure that the names of the files submitted are unique. the Contractor shall submit the file naming convention to the Contracting Officer's Representative for approval.

### 3.5.2 Narrative Report

A Narrative Report shall be provided with each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the [4] [_____] most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken.

### 3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer's Representative shall be included in the schedule submission. The Narrative Report shall specifically

reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

### 3.5.4 Schedule Reports

Format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in-progress or completed.

#### 3.5.4.1 Activity Report

A list of all activities sorted according to [activity number] [or] ["I-NODE" AND "J-NODE"] and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

#### 3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

#### 3.5.4.3 Total Float Report

A list of all activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates.

#### 3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the Notice to Proceed until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer's Representative at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: [Activity Number] [or] ["i-node" and "j-node"], Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), Earnings to Date.

### 3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission [and on [monthly] [or] [quarterly] schedule update submissions] [_____]. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer's Representative will use, but is not limited to, the following conditions to review compliance with this paragraph:

#### 3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity or event number, description, duration, and estimated earned value shall be shown on the diagram.

#### 3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates,

and contract completion dates.

#### 3.5.5.3 Critical Path

The critical path shall be clearly shown.

#### 3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

#### 3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

### 3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly on-site meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor will describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer's Representative will approve activity progress, proposed revisions, and adjustments as appropriate.

#### 3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

#### 3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

#### 3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost to Date shall be subject to the approval of the Contracting Officer's Representative. The following minimum set of items which the Contractor shall address, on an activity by activity basis, during each progress meeting.

#### 3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed activities.

#### 3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations must be based on Remaining Duration for each activity.

#### 3.6.3.3 Cost Completion

The earnings for each activity started. Payment shall be based on earnings for each in-progress or completed activity. Payment for individual activities shall not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

#### 3.6.3.4 Logic Changes

All logic changes pertaining to Notice to Proceed on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, [lag durations,] and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

#### 3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities are those delays beyond the Contractors control such as strikes and unusual weather. Also included are delays encountered due to submittals, Government Activities, deliveries or work stoppage which makes re-planning the work necessary, and when the schedule does not represent the actual prosecution and progress of the work.

### 3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, he shall furnish such justification, project schedule data and supporting evidence as the Contracting Officer's Representative may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

#### 3.7.1 Justification of Delay

The project schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's Representative's determination as to the number of allowable days of contract extension, shall be based upon the project schedule updates in effect for the time period in question and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, shall not be a cause for a time extension to the contract completion date.

#### 3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under two weeks based upon the most recent schedule update at the time of the Notice to Proceed or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

a. A list of affected activities, with their associated project schedule activity number.
b. A brief explanation of the causes of the change.
c. An analysis of the overall impact of the changes proposed.
d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

#### 3.7.3 Additional Submission Requirements

For any request for time extension for over 2 weeks, the Contracting Officer's Representative may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's Representative's request.

### 3.8 DIRECTED CHANGES

If Notice to Proceed (NTP) is issued for changes prior to settlement of price and/or time, the

Contractor shall submit proposed schedule revisions to the Contracting Officer's Representative within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer's Representative prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer's Representative may furnish the Contractor suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until the Contractor submits revisions, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer's Representative, then the Contractor shall advise the Contracting Officer's Representative within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor will continue to update their schedule with the Contracting Officer's Representative's revisions until a mutual agreement in the revisions may be made. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's Representative's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's Representative's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

### 3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

# SECTION 01330
# SUBMITTAL PROCEDURES
# (DESIGN/BUILD)
# 10/2000

**********

**NOTE: This guide specification covers procedures to be used in making submittals called for in other sections of the specifications. This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-1-8155. This specification has been edited to include provisions which are applicable only to design build projects and procedures.**

**********

## PART 1 GENERAL

### 1.1 SUBMITTAL IDENTIFICATION

**********

**NOTE: Submittal categories (SD numbers and titles) listed in this paragraph are those that are included in the SPECSINTACT software. Submittal registers for projects using any or all of these submittal categories can be generated using the SPECSINTACT software. The Resident Management System (RMS) software can produce a submittal register using the SPECSINTACT submittal categories or additional categories as may be required.**

**Submittal categories are for convenience in identifying submittals required, and the titles used are reasonably self-explanatory. Detailed category definitions are not necessary for the designer or the Contractor and could conflict with requirements specified in other sections.**

**********

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

SD-02 Shop Drawings

SD-03 Product Data

SD-04 Samples

SD-05 Design Data

SD-06 Test Reports

SD-07 Certificates

SD-08 Manufacturer's Instructions

SD-09 Manufacturer's Field Reports

SD-10 Operation and Maintenance Data

SD-11 Closeout Submittals

**1.2 SUBMITTAL CLASSIFICATION**

Submittals are classified as follows:

1.2.1 Designer of Record Approved.

Designer of Record approval is required for extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer's Representative. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings". The Contractor shall provide the Government the number of copies designated hereinafter of all Designer of Record approved submittals. The Government may review any or all Designer of Record approved submittals for conformance to the Solicitation and Accepted Proposal. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below.

1.2.2 Government Approved Construction Submittals.

Administrative Contracting Officer approval is required for any deviations from the Solicitation or Accepted Proposal and other items as designated by the Contracting Officer' Representative. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings".

1.2.3 Government Reviewed Extension of Design.

Government review is required for extension of design construction submittals, used to define contract conformity, and for deviation from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the Designer of Record design documents do not include enough detail to ascertain contract compliance. Government review is not required for extensions of design such as structural steel or reinforcement shop drawings.

1.2.4 Information Only.

All submittals not requiring Designer of Record or Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.1.5 GOVERNMENT REVIEWED OR "APPROVED" SUBMITTALS

The Contracting Officer's Representative conformance review or approval of submittals shall not be construed as a complete check, but will indicate only that the design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal. Government Review or approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor, under the Design and CQC requirements of this contract, is responsible for design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work. After submittals have been reviewed for conformance or approved, as applicable, by the Contracting Officer' Representative, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

### 1.2 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer's Representative, obtain the Designer of Record's approval, when applicable, and promptly furnish a corrected submittal in the form an number of copies specified for the initial submittal. Any "information only" submittal found to contain errors or unapproved deviations from the Solicitation or Accepted Proposal shall be resubmitted as one requiring "approval" action, requiring both Design of Record and Government approval. If the Contractor considers any correction indicated by the Government on the submittals to constitute a change to the contract, it shall promptly provide a notice in accordance with the Contract Clause "Changes" to the Contracting Officer's Representative.

### 1.3 WITHHOLDING OF PAYMENT

No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

## PART 2 PRODUCTS (Not used)

## PART 3 EXECUTION

### 3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.1.1 Design Submittals

The Contractor shall provide design submittals in accordance with Section 01012 entitled “DESIGN AFTER AWARD”.

### 3.2 SUBMITTAL REGISTER

The Contractor's Designer(s) of Record shall develop a complete list of submittals during design. The Designer of Record shall identify required submittals in the specifications. Use the list to prepare ENG Form 4288 Submittal Register or a computerized equivalent. The list may not be all inclusive and additional submittals may be required by other parts of the contract. The Contractor is required to complete ENG Form 4288 (including columns "a" through "r") and submit to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The approved submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. The submit dates and need dates used in the submittal register shall be coordinated with dates in the Contractor prepared progress schedule. Updates to the submittal register showing the

Contractor action codes and actual dates with Government action codes and actual dates shall be submitted monthly or until all submittals have been satisfactorily completed. When the progress schedule is revised, the submittal register shall also be revised and both submitted for approval. The Contractor shall maintain a submittal register for the project in accordance with Section 01312 RESIDENT MANAGEMENT SYSTEM (RMS).

## 3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of [_____] calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. An additional [_____] calendar days shall be allowed and shown on the register for review and approval of submittals for [food service equipment] [and] [refrigeration and HVAC control systems].

## 3.4 TRANSMITTAL FORM (ENG FORM 4025)

**********

**NOTE: ENG Form 4025 is not a part of this guide specification; the sample ENG Form 4025 must be added to this section locally. If the Contractor is required to use the RMS-QC software for the contract, that system included an electronic version of ENG Form 4025.**

**********

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms are included in the RMS-QC software that the Contractor is required to use for this contract. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

## 3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

### *3.5.1 Procedures*

The Government will further discuss and detail the required submittal procedures at the Pre-Construction Conference.

### *3.5.2 Deviations*

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. As stated above, the Contractor's Designer of Record approval is required for any proposed deviations. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

## 3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

### 3.7 GOVERNMENT CONFORMANCE REVIEW AND APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. [_____] copies of the submittal will be retained by the Contracting Officer and [_____] copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

### 3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

### 3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR
(Firm Name)

____ Approved
____ Approved with corrections as noted on the submittal data and/or attached sheets.

SIGNATURE:_____

TITLE: (DESIGNER OF RECORD)

DATE:_____

# SECTION 01451

# CONTRACTOR QUALITY CONTROL (DESIGN-BUILD)

[*Design Districts shall review and edit this specification as necessary to suit the project.]*

## PART 1 - GENERAL

### 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM D 3740 | (1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction |
| ASTM E 329 | (1995b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction |

### 1.2 PAYMENT

No separate payment will be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

### 3.2 QUALITY CONTROL PLAN

#### 3.2.1 General

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control,

instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 60 days of operation. Design and Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, designers of record, consultants, architect/engineer's (A/E's), fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, designers of record, consultants, A/E's, off-site fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 - SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (The Contracting Officer must approve Laboratory facilities.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats. The Contractor shall utilize a Government-furnished software program titled "RMS" (Resident Management System). See paragraph, IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM FOR CONTRACTOR QUALITY CONTROL OF CONTRACT, of this section for additional details.

h. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

i. A list of tests to be performed shall be furnished as a part of the CQC Plan. The list shall give the test name, frequency, specification paragraph containing the test requirement, the personnel and laboratory

responsible for each type of test, and an estimate of the number of tests required.

j. RMS will assist in tracking and reporting for the above requirements. Sample forms generated from the software package shall be used as part of the CQC Plan.

k. Design Quality Control (DQC) Plan

The Contractor's DQC Plan shall provide and maintain an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents shall be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product shall not perform the independent technical review (ITR). In addition, the DQC Plan shall incorporate the Lessons Learned Databases provided by the Government. The Contractor shall correct errors and deficiencies in the design documents prior to submitting them to the Government.

The Contractor shall include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major tasks including those that control the flow of work. The schedule shall include review and correction periods associated with each item. This should be a forward planning as well as a project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised schedule reflecting the change within seven calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation. Example checklists can be found in ER 1110-1-12.

The DQC Plan shall be implemented by an assigned person with the Contractor's organization who has the responsibility of being present during the times work is in progress, and shall be cognizant of and assure that all documents on the project have been coordinated. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

The Contracting Officer will notify the Contractor, in writing, of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of design and/or construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction phases. The Government reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Pre-design Conference, before start of design and/or construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting. During the

meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

## 3.4 QUALITY CONTROL ORGANIZATION

### 3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, Designer of Record and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization, which shall be at the site at all times during progress of the construction work and who have complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

### 3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the on site work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during construction activities and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC Manager.

### 3.4.3 CQC Specialists

[NOTE TO SPECIFIER: OPTIONAL ADDITIONAL PERSONNEL - SELECT AS NEEDED- BUT KEEP TO MINIMUM NECESSARY]

In addition to CQC personnel previously specified, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager in the areas listed below. The staff listed below shall be directly employed by the prime Contractor. The CQC specialist shall be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

EXPERIENCE MATRIX- [EXAMPLES- EDIT AS NECESSARY FOR JOB]

| Area | Qualifications |
|---|---|
| a. Mechanical: | Graduate Mechanical Engineer with 2 years experience or a technician with 5 years related experience. |
| b. Electrical: | Graduate Electrical Engineer with 2 years experience or a technician with 5 years related experience. |
| c. Occupied Family Housing: | Person, customer relations type, coordinator experience. |

d. Submittals: Submittal Clerk with 1 year experience.

3.4.4 Additional Requirement

In addition to the above experience and education requirements, the CQC System Manager shall have completed the course entitled, "Construction Quality Management for Contractors". Specific times and locations for this training are available from the Contracting Officer.

3.4.5 Organizational Changes

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement. Upon acceptance of any changes, the Contractor shall revise the CQC plan to accurately reflect the changes. The CQC plan shall be kept current at all times during the life of the contract.

3.5 SUBMITTALS AND DELIVERABLES

Materials submittals, as necessary, shall be made as specified in Section 01330 - SUBMITTAL PROCEDURES. Design submittals shall be made as required in Section 01012 - DESIGN AFTER AWARD. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM (RMS) FOR CONTRACTOR QUALITY CONTROL OF CONTRACT

The Contractor shall utilize a Government-furnished software program entitled "RMS" (Resident Management System) to maintain critical information needed to manage the project. RMS produces up-to-date management and analysis reports as well as a majority of the forms required in this contract for submission to the Government. One such form is the Daily CQC Reporting System form, which is required to be utilized by the Contractor. This form may be in addition to other Contractor desired reporting forms. However, all other such reporting forms shall be consolidated into this one Government specified Daily CQC Report Form.

The Contractor will also be required to complete RMS Program Module elements which includes, but is not limited to, Prime Contractor staffing; letter codes; planned cumulative progress earnings; subcontractor information showing trade, name, address, point-of-contact, and insurance expiration dates; definable features of work; pay activity and activity information; required Quality Control tests tied to individual activities; planned User Schooling tied to specific specification paragraphs and contractor activities; Installed Property Listing, Transfer Property Listing and submittal information relating to specification section, description, activity number, review period and expected procurement period. The sum of all activity values shall equal the contract amount, and all Bid Items, Options and Additives shall be separately identified, in accordance with the "Bidding Schedule". Bid Items may include multiple Activities, but Activities may only be assigned to one such Bid Item. This Module shall be completed to the satisfaction of the Contracting Officer prior to any contract payment (except for Bonds, Insurance and/or Mobilization, as approved by the Contracting Officer) and shall be updated as required.

During the course of the contract, the Contractor will receive various Quality Assurance comments from the Government that will reflect corrections needed to Contractor activities or reflect outstanding or future items needing the attention of the Contractor. The Contractor will acknowledge receipt of these comments by specific number reference on his Daily CQC Report, and will also reflect on his Daily CQC Report when these items are specifically completed or corrected to permit Government verification.

The Contractor's schedule system shall include, as specific and separate activities, all Preparatory Phase Meetings (inspections); all O&M Manuals; and all Test Plans of Electrical and Mechanical Equipment or Systems that require validation testing or instructions to Government representatives.

The following minimum hardware and software requirements are needed by the Contractor to run RMS:
A personal computer with Pentium II processor (or higher)
Sixteen megabytes (MB) or more of random access memory (RAM)
30 MB of free hard disk space
A 3-1/2 inch high density floppy drive. Also needed is a
HP LaserJet Series III printer or later (or compatible),
A color monitor,
MS-DOS, version 5.0 or later, RMS will run under the Windows Operating System

Once the Contract is awarded, the Contractor will be given a copy of the RMS program for implementation. A meeting between the Government and the Contractor will be arranged to inform the Contractor on the use of the software package which is similar to the one the Government will use to manage the project. File updates will be transferred to the Government by disk on a weekly basis, unless electronic transfers are agreed on.

3.7 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the design and construction, to include work of the designer of record, consultants, subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable features of work as follows:

3.7.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications.
b. A review of the contract drawings.
c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
d. Review of provisions that have been made to provide required control inspection and testing.
e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
j. Discussion of the initial control phase.
k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. [The time and date of the preparatory meeting shall be logged in RMS QC.] The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.7.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
d. Resolve all differences.
e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
g. The initial phase should be repeated for each new crew to work on site, or any time acceptable specified quality standards are not being met.

3.7.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.7.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.8 TESTS

3.8.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.
b. Verify that facilities and testing equipment are available and comply with testing standards.
c. Check test instrument calibration data against certified standards.
d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. If Approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract. The Contractor shall maintain a test log of all tests performed, by type, date, and specification section.

3.8.2 Testing Laboratories

3.8.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.8.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of [$1,000.00] [Design District to insert costs] to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.8.3 On Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.9 COMPLETION INSPECTION

3.9.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.9.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or an particular increment thereof if the project is divided into increments by separate completion dates.

3.9.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be

complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9.4 Post Completion Feedback Meeting and Preparation of Written Minutes

At the completion of this project, the CQC Systems Manager will host a meeting to review the project and to discuss lessons learned during the construction of the project. This meeting should be scheduled for 4 hours on-site and should be attended by the Project Manager and representatives of the major subcontractors, including mechanical and electrical. The Contracting Officer will invite members of the design team to participate in this meeting.

3.10 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.
b. Operating plant/equipment with hours worked, idle, or down for repair.
c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
f. Submittals reviewed, with contract reference, by whom, and action taken.
g. Offsite surveillance activities, including actions taken.
h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
i. Instructions given/received and conflicts in plans and/or specifications.
j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10.1 Correspondence

The Contractor shall establish and implement a serialized numbering system for letters sent to the Government. The numbering system shall identify the contract number and shall progress sequentially starting with the number one (1) and continuing thereafter without break in numbering. All letters sent to the Government shall include a subject heading which identifies the Contract Clause Number, Special Clause Number, or Technical Provision Number, and the particular subject item addressed by the letter.

3.11 SAMPLE FORMS

Sample forms are enclosed at the end of this section as follows:

[Design District to include applicable form samples at the end of this section.]

3.12 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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# ATTACHMENT 2

# OUTLINE SPECIFICATION

**ATTACHMENT 2**

**OUTLINE SPECIFICATION**

Proposal Number: _____ Project No.: _____
Project Name: _____ Date: _____
Location: _____

| INSTRUCTIONS |
| --- |
| Describe all materials and equipment to be used. Include no alternates or equivalents. Show extent of work and typical details on drawings. Attach additional sheets if necessary to completely describe the work. The cost estimate will recognize quality products and materials in excess of acceptable minimums, when specified. Certain parts of the work cannot be put in their proper classification until more information about their materials and construction are known; therefore describe, under suitable categories below, the following: main service and other stairs, treads, risers, handrails, balusters, etc., sound insulation of partitions and floors separating dwelling units and between dwelling units and public spaces, utility conduits and tunnels, waterproofing and drainage, utilities, and related insulation; retaining walls; garages and accessory buildings, and off-site improvements required to serve the project such as roads, curbs, walks, utilities, storm sewers, and planting. |
| NOTE: This outline is based on the "Uniform System" for Construction Specifications, Data Filing, and Cost Accounting developed by AIA, CSI and AGC. |

**1. GENERAL REQUIREMENTS:**

**2. SITE WORK:**

Type of Soil:
Bearing Capacity:

Material and thickness of fill and base course:

Demolition: Construction of structures to be demolished and materials to be reused.

Other land improvements.

Storm Drainage: Culverts, pipes, manholes, catch basins, downspout connection (dry well, splash blocks, storm sewer).

Site Preparation: Tree protection, surgery, wells, walls, topsoil stripping, clearing, grubbing, and rough grading.

Curbs and Gutters: Type and material.

Pavement: Material and thickness of base and wearing surface for drives, parking areas, streets, alleys, courts, walks, drying yards, and play areas. Steps, handrails, checkwalls.

Equipment for Special Areas and Enclosures: Play equipment, benches, fences.

Finish Grading: Approximate existing depth and method of improving topsoil. Extent of finish grading.

Lawns and Planting: Type, size, quantity, and location of lawn, ground cover and hedge material, trees, shrubs, etc.

**3. CONCRETE:**

Concrete strength for exterior walls below and above grade, interior walls and partitions, piers, footings, columns and girders. Size, thickness, and location on drawings. Note portions having reinforcing steel on drawings. Location, size, and material of footing drains and outlet.

Structural system of concrete floors at basement, other floors, and roof. Thickness of slabs and strength of concrete. Attached exterior concrete steps and porches. If more than one type of construction is used, list separately and state locations.

Slab Perimeter Insulation (Materials and Insulation Values):

**4. MASONRY:**

Material and thickness of exterior walls above and below grade, interior walls and partitions, fire walls, stair, hall and elevator enclosures, chimneys, incinerators, veneer, sills, copings, etc.

**5. METALS:**

Miscellaneous Iron: Material and size of items such as:

Access Doors:
Area Gratings:
Lintels:
Fire Stairs:
Foundation Vents:

Structural Steel: Framing or structural system used.

**6. CARPENTRY:**

Size, spacing, and grade of lumber to be used for floor, roof, and exterior walls above grade and interior partition framing, subfloor, sheathing, underlayment and exterior finish materials (wood siding, shingles, asbestos siding, etc.)

Grade and species for interior and exterior finish work.

**7. MOISTURE PROTECTION:**

Materials and method of waterproofing walls and slabs below grade, location, thickness or number of plies. Type of permanent protection of waterproofing (parging) if used. Method of dampproofing above grade. Flashing materials if other than sheet metal. Spandrel waterproofing.

Thermal Insulation: Thickness, R-value, and type of material.

Method of Installation
Exterior Walls:
Ceiling Below Roof:
Roof:
Other:

Roofing: Roof covering materials and method of application, weight of shingles, number of felt plies, bitumen, etc.

Sheet Metal: Material and weight or gauge for flashings, copings, gutters and downspouts, roof ventilators, scuppers, etc.

Sealants:

Infiltration Barrier:

Housing Unit Tightness Testing: (Identify methodology and systems to be utilized for blower door testing of units:

**8. DOORS, WINDOWS AND GLASS:**

Windows and Frames: Type and material. Special construction features or protective treatment.

Glazing:

U-Value:

Water Penetration Rate:

Air Infiltration Rate:

Operating Force Necessary:

Structural Testing Result:

Doors and Frames:

Exterior: Thickness, material, and type at each location.

Interior: Thickness, material, and type for public halls and stairs, dwelling units (entrance and interior), boiler rooms, fire doors and other locations.

Finish Hardware:
Material and finish of exterior and interior locksets, sliding and folding door hardware, window and cabinet hardware, door closers, door knockers, numbers, etc.

Thresholds:

Screens: Type and material of mesh and frames.

**9. FINISHES:**

Grade, material, and thickness of all finishes

Painting: Type and number of coats.

Exterior:

Wood:
Metal:
Masonry:
Interior:

Walls and Ceilings:
Kitchen and Bath:
Trim and Millwork:

Tile and Ceramic Bathroom Accessories:

Floor and Wall
Bathroom Accessories: Materials and quantity.
Attached:
Recessed:

Resilient Flooring: Location, type, and gauge for all materials.

Other Finish Materials:

Indicate thickness, grade, finish and wainscot height.

| LOCATION | FLOORS | WALLS | WAINSCOT |
|---|---|---|---|
| a. | | | |
| b. | | | |
| c. | | | |

**10. SPECIALTIES:**

List significant Items.

Interior partitions other than concrete, masonry, or wood.

Medicine Cabinets: Material, size, and type.

Mailbox Systems.

**11. EQUIPMENT: (Appliances are required to be "Energy Star" labeled.)**

Refrigerators. Capacity for each size of housing unit.

Kitchen Ranges: Size and type for each size of housing unit.

Kitchen Cabinets: Material and finish.
Wall Units:
Base Units:
Counter Top and Backsplash Material:
Other Cabinets and Built-in Storage Units:

Garbage disposal units, dishwashers, clothes washers and dryers.

**12. FURNISHINGS:**

Blinds: Venetian blinds or other devices for privacy and control of natural light.

**13. SPECIAL CONSTRUCTION:**

**14. CONVEYING SYSTEMS:**

Elevators: Attach letter from manufacturer whose elevator installation is proposed, containing a brief comprehensive specification for the complete elevator installation, and the manufacturer's statement that the number of elevators proposed and the installation described will provide adequate service, and that the manufacturer maintains an effective service organization in the project locality.

**15. MECHANICAL:**

Plumbing Fixtures: Material, size, fittings, trim, and color.

Sink:
Shower over Tub:
Lavatory:
Stall Shower:
Water Closet:
Bathtub:
Tub Enclosure:
Other:

Piping Systems: Material and fittings.

Domestic Water:
DWV :

Natural or Propane Gas:

Standpipes:

Interior Downspouts:

Domestic Water Heating: Type, storage capacity, recovery rate, and efficiency rating.

Direct Fired:

Indirect Fired: (Separate boiler or combined with space heating boiler).

Heating:

Kind of System: (Hot water, steam, forced air, etc.)

Fuel Used:
Total Calculated Load:

Equipment: (Make and Model)

Space Heaters: Type, make, model, location, and output of heating systems such as wall heaters, furnaces, and unit heaters.

Solar Energy:
Application: (Heating and domestic water heating)

System
Subsystem
System Capacity

Insulation: Type and thickness of insulation on water lines and water heating equipment.

Distribution System:

Insulation: Type and thickness of insulation on heating equipment and distribution system.

Duct:

Pipe:

Duct Tightness Testing: (Identify materials and proposed methodologies for duct tightness testing)

Room Heating Devices: Baseboard units, radiators, convectors, registers, diffusers, etc.

Temperatures Controls: Individual unit, zone, central, etc.

Engineered Ventilation System: Location, capacity, and purpose of ventilating fans.

Air Conditioning: Unitary equipment, self contained or packaged units, or split systems.

Calculated cooling load:

Equipment: Make, model, operating voltage, and capacity for each size serving individual rooms, dwelling units, or zone.

Central System:

Calculated Load:

Equipment: Make, model, capacity, etc., of compressor, condenser, cooling tower, water chillers, air handling equipment, and other components which make up the complete system.

Utilities On-Site: Material for distribution system for all piped utilities.

Water Supply: Fire hydrants, yard hydrants, lawn sprinkler systems, and exterior drinking fountains.

Gas:

Sanitary Sewerage: Treatment plants, pumping stations, and manholes.

**16. ELECTRICAL:**

Electrical Wiring: Type of wiring and load centers, number of circuits per living unit, individual living unit metering or project metering, spare conduit for future load requirements, radio or TV antenna systems. Show receptacles, light outlets, switches, power outlets, telephone outlets, door bells, fire alarm systems, etc., on drawings.

Electric Fixtures: Type for various locations.

Electric light standards for lighting grounds, streets, courts, etc. Underground or overhead service.

All items of construction, equipment and finish, together with all incidentals, which are essential to the completion of the project will be provided whether or not specifically included in the proposal and will be of a type, quality and capacity acceptable to US Army Corps of Engineers standards as outlined in this solicitation and appropriate to the character of the project.

Proposal Number:

Date:

# ATTACHMENT 3

# FORMAT FOR REQUIRED CALCULATIONS

# ATTACHMENT 3

## FORMAT FOR REQUIRED CALCULATIONS METRIC

**OFFEROR'S IDENTIFICATION NUMBER:** _____

**HOUSING UNIT TYPE:**_____

[Note: Providing calculations in metric is mandatory. The Design District may add revise this format to include inch-pound units in addition to the required metric units.]

**1. NET AREA CALCULATIONS:** See Table 5-1, SIZE OF HOUSING UNITS BY PAY GRADE in the Statement of Work for required areas.

a. Gross Area: _____ m2 (As defined by the AIA)

b. Exterior Wall Thickness: _____ mm

c. Interior Area: _____ m2
(Area within the inside finishes of exterior or party walls, excluding carport or garage.)

d. Complete the Spreadsheet below – length/width in mm and area in m2.

[USACE Design District shall edit this chart as applicable to the specific project. Insert "N/A" on those spaces which are not part of the project.]

| Deduct | Space | Length | | Width | | Area | |
|---|---|---|---|---|---|---|---|
| | | RFP Min | Proposed | RFP Min | Proposed | Deduct | Non-Deduct |
| N | Living Room | 3550 | | 3550 | | | |
| N | Dining Room (2/3 Br) | 2900 | | 2900 | | | |
| N | Dining Room (4/5 Br) | 3200 | | 3200 | | | |
| N | Dining Room (GO) | 3650 | | 3650 | | | |
| N | Family Room | 2900 | | 2900 | | | |
| N | Kitchen | 2450 | | 2450 | | | |
| N | Eat-In Kitchen | 2600 | | 2600 | | | |
| N | Refrigerator/Freezer | 900 | | 600 | | | |
| N | W/D | 1800 | | 900 | | | |
| N | Bedroom #1 | 3550 | | 3550 | | | |
| N | Bedroom #2 | 3000 | | 3000 | | | |
| N | Bedroom #3 | 3000 | | 3000 | | | |
| N | Bedroom #4 | 2900 | | 2900 | | | |
| N | Bedroom #5 | 2900 | | 2900 | | | |
| N | One-half Bath | - | | 900 | | | |
| N | Full Bath #1 | - | | 1500 | | | |
| N | Full Bath #2 | - | | 1500 | | | |
| N | Vestibule | 1000 | | 1200 | | | |
| Y | Stairwell & Landings | - | | 1000 | | | |
| N | Upstairs Hallway | - | | 1000 | | | |

| Deduct | Space | Length | | Width | | Area | |
|---|---|---|---|---|---|---|---|
| | | RFP Min | Proposed | RFP Min | Proposed | Deduct | Non-Deduct |
| N | Downstairs Hallway | - | | 1000 | | | |
| Y | Utility Room | - | | - | | | |
| Y | Interior Bulk Storage | - | | - | | | |
| Y | Mechanical Room | - | | - | | | |
| Y | Unfinished Attic | - | | - | | | |
| Y | Unfinished Basement | - | | - | | | |
| Y | Accessibility Increases | - | | - | | | |
| | | | | | | | |
| N | *Proposed Space* | - | | - | | | |
| N | *Proposed Space* | - | | - | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| TOTAL DEDUCTABLE AREAS | | | | | | | |
| | | | | | | | |

Notes on Completing Table:

1. Room dimensions are exclusive of circulation. Circulation paths along one side of a room are permitted by add 1000 mm to the minimum dimension. Note applies to Living, Dining and Family Rooms only.
2. Minimum dimensions are taken from face of cabinets to walls. This note applies to kitchens and eat-in kitchens.
3. Minimum dimensions shown for washer/dryer are for a W/D closet only. This area may be provided in a utility room. When so provided, area and dimensions are exclusive of circulation.
4. When the washer/dryer is included in a utility room, the W/D line shall be completed as N/A.
5. For hallways and stairs, clear width is measured between railings.
6. Accessibility increases must conform to UFAS.

e. Net Area Determination

| Solicitation Requirements | | Proposal | |
|---|---|---|---|
| Minimum Net Allowable Area | | Interior Area from 1.c above | |
| Basic Net Area | | Deductable Area from 1.d above | |
| Maximum Allowable Net Area | | Interior Area less Deductable Area = Proposed Net Area | |
| These values shall be taken from Table 5-1 in the Statement of Work | | | |

Note: All areas are to be shown in m2

**2. FORMAT FOR KITCHEN CABINET SIZE VALIDATION:** See Table 5-5 – Kitchen Cabinet, Counter, & Pantry Area in the Statement of Work.

| **Element** | **Required Area (m2)** | **Proposed Area (m2)** | **Percent of Required Area** |
|---|---|---|---|
| Wall Cabinets | | | |
| Base Cabinets | | | |
| Drawer Area | | | |
| Counter Area<br><br>(Exclusive of area occupied by sink and range.) | | | |
| | | | |

**3. FORMAT FOR CLOSET SIZE VALIDATION:** See Table 5-6 – Minimum Closet widths in the Statement of Work.

| **Element** | **Required Area (m2)** | **Proposed Area (m2)** | **Percent of Required Area** |
|---|---|---|---|
| Coat/Entry Hall | | | |
| Master Bedroom #1 | | | |
| Bedroom #2 | | | |
| Bedroom #3 | | | |
| Bedroom #4 | | | |
| Bedroom #5 | | | |
| Broom Closet | | | |
| Linen Closet | | | |
| Other | | | |
| | | | |

**4. FORMAT FOR BULK STORAGE SIZE VALIDATION.** See Table 5-7 – Minimum interior, exterior, & combined bulk storage in the Statement of Work.

| **Element** | **Required Area (m2)** | **Proposed Area (m2)** | **Percent of Required Area** |
|---|---|---|---|
| Interior | | | |
| Exterior | | | |
| Totals | | | |

**5. FORMAT FOR PATIO AND BALCONY SIZE VALIDATION:** See Table 5-4 – Minimum Areas and Dimensions – Exterior Spaces in the Statement of Work.

| **Spaces** | **Solicitation Requirements** | | **Proposal** | |
|---|---|---|---|---|
| | **Area (m2)** | **Dimension (mm)** | **Area** | **Dimension** |
| Balconies | 6.7 | 1800 | | |
| Patio – 2 Br | 11.2 | 2400 | | |
| Patio – 3 Br | 13.6 | 3000 | | |
| Patio – 4 Br | 17.0 | 3000 | | |
| Patio – 5 Br | 20.4 | 3700 | | |
| | | | | |

# ATTACHMENT 3

## FORMAT FOR REQUIRED CALCULATIONS
## ENGLISH

**OFFEROR'S IDENTIFICATION NUMBER:** _____

**HOUSING UNIT TYPE:**_____

[Note: Providing calculations in metric is mandatory. The Design District may add revise this format to include inch-pound units in addition to the required metric units.]

**1. NET AREA CALCULATIONS:** See Table 5-1, SIZE OF HOUSING UNITS BY PAY GRADE in the Statement of Work for required areas.

a. Gross Area: _____ SF (As defined by the AIA)

c. Exterior Wall Thickness: _____ In

c. Interior Area: _____ SF
(Area within the inside finishes of exterior or party walls, excluding carport or garage.)

e. Complete the Spreadsheet below – length/width in mm and area in SF.

[USACE Design District shall edit this chart as applicable to the specific project. Insert "N/A" on those spaces which are not part of the project.]

| Deduct | Space | Length | | Width/Depth | | Area | |
|---|---|---|---|---|---|---|---|
| | | RFP Min | Proposed | RFP Min | Proposed | Deduct | Non-Deduct |
| N | Living Room | 11'-8" | | 11'-8" | | | |
| N | Dining Room (2/3 Br) | 9'-6" | | 9'-6" | | | |
| N | Dining Room (4/5 Br) | 10'-6" | | 10'-6" | | | |
| N | Dining Room (GO) | 12'-0" | | 12'-0" | | | |
| N | Family Room | 9'-6" | | 9'-6" | | | |
| N | Kitchen | 8'-0" | | 8'-0" | | | |
| N | Eat-In Kitchen | 8'-6" | | 8'-6" | | | |
| N | Refrigerator/Freezer | 3'-0" | | 2'-0" | | | |
| N | W/D | 6'-0" | | 3'-0" | | | |
| N | Bedroom #1 | 11'-8" | | 11'-8" | | | |
| N | Bedroom #2 | 10'-0" | | 10'-0" | | | |
| N | Bedroom #3 | 10'-0" | | 10'-0" | | | |
| N | Bedroom #4 | 9'-6" | | 9'-6" | | | |
| N | Bedroom #5 | 9'-6" | | 9'-6" | | | |
| N | One-half Bath | - | | 3'-0" | | | |
| N | Full Bath #1 | - | | 5'-0" | | | |
| N | Full Bath #2 | - | | 5'-0" | | | |
| N | Vestibule | 3'-3" | | 4'-0" | | | |
| Y | Stairwell & Landings | - | | 3'-3" | | | |
| N | Upstairs Hallway | - | | 3'-3" | | | |

| Deduct | Space | Length | | Width/Depth | | Area | |
|---|---|---|---|---|---|---|---|
| | | RFP Min | Proposed | RFP Min | Proposed | Deduct | Non-Deduct |
| N | Downstairs Hallway | - | | 3'-3" | | | |
| Y | Utility Room | - | | - | | | |
| Y | Interior Bulk Storage | - | | - | | | |
| Y | Mechanical Room | - | | - | | | |
| Y | Unfinished Attic | - | | - | | | |
| Y | Unfinished Basement | - | | - | | | |
| Y | Accessibility Increases | - | | - | | | |
| | | | | | | | |
| N | *Proposed Space* | - | | - | | | |
| N | *Proposed Space* | - | | - | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| TOTAL DEDUCTABLE AREAS | | | | | | | |
| | | | | | | | |

Notes on Completing Table:

7. Room dimensions are exclusive of circulation. Circulation paths along one side of a room are permitted by add 1000 mm to the minimum dimension. Note applies to Living, Dining and Family Rooms only.
8. Minimum dimensions are taken from face of cabinets to walls. This note applies to kitchens and eat-in kitchens.
9. Minimum dimensions shown for washer/dryer are for a W/D closet only. This area may be provided in a utility room. When so provided, area and dimensions are exclusive of circulation.
10. When the washer/dryer is included in a utility room, the W/D line shall be completed as N/A.
11. For hallways and stairs, clear width is measured between railings.
12. Accessibility increases must conform to UFAS.

e. Net Area Determination

| Solicitation Requirements | | Proposal | |
|---|---|---|---|
| Minimum Net Allowable Area | | Interior Area from 1.c above | |
| Basic Net Area | | Deductable Area from 1.d above | |
| Maximum Allowable Net Area | | Interior Area less Deductable Area = Proposed Net Area | |
| These values shall be taken from Table 5-1 in the Statement of Work | | | |

Note: All areas are to be shown in SF

**2. FORMAT FOR KITCHEN CABINET SIZE VALIDATION:** See Table 5-5 – Kitchen Cabinet, Counter, & Pantry Area in the Statement of Work.

| Element | Required Area (SF) | Proposed Area (SF) | Percent of Required Area |
|---|---|---|---|
| Wall Cabinets | | | |
| Base Cabinets | | | |
| Drawer Area | | | |
| Counter Area<br><br>(Exclusive of area occupied by sink and range.) | | | |
| | | | |

**5. FORMAT FOR CLOSET SIZE VALIDATION:** See Table 5-6 – Minimum Closet widths in the Statement of Work.

| Element | Required Area (SF) | Proposed Area (SF) | Percent of Required Area |
|---|---|---|---|
| Coat/Entry Hall | | | |
| Master Bedroom #1 | | | |
| Bedroom #2 | | | |
| Bedroom #3 | | | |
| Bedroom #4 | | | |
| Bedroom #5 | | | |
| Broom Closet | | | |
| Linen Closet | | | |
| Other | | | |
| | | | |

**6. FORMAT FOR BULK STORAGE SIZE VALIDATION.** See Table 5-7 – Minimum interior, exterior, & combined bulk storage in the Statement of Work.

| Element | Required Area (SF) | Proposed Area (SF) | Percent of Required Area |
|---|---|---|---|
| Interior | | | |
| Exterior | | | |
| Totals | | | |

**5. FORMAT FOR PATIO AND BALCONY SIZE VALIDATION:** See Table 5-4 – Minimum Areas and Dimensions – Exterior Spaces in the Statement of Work.

| **Spaces** | **Solicitation Requirements** | | **Proposal** | |
|---|---|---|---|---|
| | **Area (SF)** | **Dimension (ft-in)** | **Area** | **Dimension** |
| Balconies | 72 | 6'-0" | | |
| Patio – 2 Br | 120 | 8'-0" | | |
| Patio – 3 Br | 144 | 10'-0" | | |
| Patio – 4 Br | 180 | 10'-0" | | |
| Patio – 5 Br | 216 | 12'-0" | | |
| | | | | |

# ATTACHMENT 4

# PROPOSAL DATA SHEET

**ATTACHMENT 4**

**PROPOSAL DATA SHEET**
[PROJECT TITLE]
[PROJECT LOCATION]

| Note to Design Activity |
| --- |
| Inclusion of the Performance Capability Data Sheet in the RFP is the USACE design activity's option. Requirements for demonstration of offeror capability are stated in the RFP Section 00110. This paragraph requires completion of RFP Section 00800, Attachment 4, Proposal Data Sheet. The performance capability evaluation is also referred to as Factor 5 in RFP Section 00120, EVALUATION CRITERIA FOR TECHNICAL PROPOSALS. When using the following coordinate with APPENDIX C of the Project Management Manual (Volume 1), OFFEROR PERFORMANCE CAPABILITY EVALUATION MANUAL. |

| Note to Offerors |
| --- |
| This OFFEROR PERFORMANCE CAPABILITY PROPOSAL DATA SHEET must be completed and attached as the first page of the body of your proposal. |

**1. NAME OF OFFEROR.**

Name of Offeror(s):

If a joint venture or contractor-subcontractor association of firms, list the individual firms and briefly describe the nature of the association.

Firm 1:
Firm 2:
Firm 3:
Firm 4:

Nature of Association:

**2. AUTHORIZED NEGOTIATORS.** FAR 52.215-11

The offeror or quoter represents that the following persons are authorized to negotiate on its behalf with the Government in connection with this Request for Proposals (RFP) or quotations.

[List names, titles, and telephone number of the authorized negotiator.]

Name of Person Authorized to Negotiate:

Contact's Address:

Contact's Telephone:

**PROPONENT.** If different from 2. above.

Name:
Address:

Telephone:

**3. PROJECT EXAMPLES.** On an attached sheet, list (preferably three) projects of similar design that have been done by the offeror. List date of construction completion, address of building(s), address and telephone number of owner. Indicate type of project (private sector, Government, planned unit development, etc.), general character, total cost, and total cost of all modifications. If offeror is made up of separate design and construction companies that have combined for this project, then this item must be completed twice (once for each company).

a. On an attached sheet, list any projects within the last five years that have been assessed liquidated damages. Provide explanation.

b. On an attached sheet, list any projects within the last five years that have been terminated. Provide explanation.

c. On an attached sheet, list all contracts with the Government within the last five years. Indicate Government contract number and contracting agency (with contact names and telephone numbers).

**4. PERSONNEL WITH PRINCIPAL RESPONSIBILITY.** Include a brief resume for each person listed on an attached sheet.

| KEY DESIGN PERSONNEL | | |
|---|---|---|
| Position | Name | State of Registration |
| Project Manager | | |
| Project Architect | | |
| Landscape Architect | | |
| Structural Engineer | | |
| Electrical Engineer | | |
| Mechanical Engineer | | |
| Other (e.g., Early Childhood Play Specialist) | | |

| KEY CONSTRUCTION PERSONNEL | | |
|---|---|---|
| Position | Name | Type of Registration & State |
| Quality Control Manager | | |
| Construction Manager | | |

a. On a separate sheet, list current contracts by nature, duration, and amount, including those for which your firm is now competing or negotiating. Describe the impact of such work on this project if you are determined to be the successful proposer. Furnish a curve with the record of placement of your firm over the past three years, and your projection for the next two years. Provide a statement of the priority of this project relative to other current and anticipated commitments. Indicate the type and extent of home office support you contemplate for this project on a regular and contingency basis.

b. Indicate the approximate number of people currently on company payroll in design and construction.

c. Indicate the approximate number of people you think will be available to work on this project in both design and construction.

d. Indicate the approximate workload currently in your office in both design and construction.

(1) In Design:_____No. Projects: _____ U.S. Dollar Volume:

(2) In Construction:_____ No. Projects: _____ U.S. Dollar Volume:

e. Indicate your office capabilities for using CADD (Computer Aided Design and Drafting) and other forms of automation on this project.

f. You may provide additional information on your capabilities, but please be brief.

**5. MANAGEMENT PLAN AND QUALITY CONTROL PLAN.** Provide your Management Plan. The term "Management Plan" is defined as a plan that includes the following subplans:

Quality Control Plan.
Design Schedule.
Construction Schedule (Network Analysis).
Contract Closeout Plan.

**6. OTHER FACTORS.**

a. Has the offeror's staff visited the project site?

b. Did offeror attend pre-proposal site visit?

# ATTACHMENT 5

# PROPOSAL DRAWING FORMAT

**ATTACHMENT 5**

**PROPOSAL DRAWING FORMAT**

NOTE TO USACE DESIGN ACTIVITY: PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS are stated in Section 00110. Inclusion of additional drawing format standards in the RFP is optional. If this attachment is used, it should be coordinated with Section 00110.

**1. POLICY.**

Drawings shall be prepared in accordance with Section 00110, PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS, and the following instructions on graphic format.

**2. DRAFTING.**

a. The drawings shall show sufficient detail so that they clearly delineate the proposed construction. Original drawings shall be made on size standard size A1 [approximately 594mm x 841mm, 23 1/2" x 33"] sheets, and CADD format as defined by the design agent. The final proposal submittal of drawings shall also be in CADD format on A1 standard full size sheets as required by Section 00100, Paragraph 39. The revision block and title block shall be as provided by the design agent. Design agent may request offerors to provide proposal drawings in half-size format. [Insert Revision Block and Title Block Example at end of this attachment.]

b. The first or cover sheet shall contain the title and location of the project and the Drawing Index.

c. The drawing layout will be evaluated with care before the beginning of the drafting. Ample space, without crowding, will be provided, not only for the required plans and details with all necessary titles, dimensions and notes, but also for incidental information required, such as graphic scales, general and reference notes, schedules, North Arrow, etc.

d. Sheets shall be well ordered and drawn at the scales indicated in Section 00110. Any drawings not specifically listed shall be drawn at a reasonable scale and suitable for reduction. Cluttered and overcrowded layouts shall be avoided.

e. A graphic scale for each of the different scales used on a drawing shall be placed on the particular drawing to the left of the title block. Scale shall be indicated at each plan, elevation, section, and detail, unless all drawings on the same are at the same scale. No scale larger than 1:2 shall be used without prior approval.

f. Sheets devoted to details should have such details reasonably spaced and arranged left to right or top to bottom. Groups of details relating to one particular aspect should be adequately separated from other groups and identified with a title. Sections and details of the final design should be numerous enough to show all design features.

g. Unnecessary details or details of small standard products or items which are adequately covered by specifications and/or catalogs shall not be included on the drawings.

h. A symbol for major disciplines should be selected to properly arrange the sheets in the package. Adequate cross-referencing must be shown to avoid confusion and misunderstanding between disciplines.

**3. DRAWING PREPARATION.**

a. Preparation for Size Reduction. Since drawings will be reduced, all drafting (line widths, spacing, lettering sizes, etc.) shall be adequate size and density to be easily legible after reduction.

b. Scales. Carefully plan drawing layout together with suitable scales in advance to properly delineate the project. Similar work for all design disciplines shall, whenever possible, be shown at the same scale on the various drawings involved.

c. Lettering. Use single stroke lettering, all capitals. Minimum height shall be 5/32".

d. Sheet Reference. The proposer will reference all drawings within a discipline of work. The divisions designated below will be utilized.

| Discipline Designation | Design Discipline |
|---|---|
| T | Title, Location Map, & General Notes |
| L | Site Planning, Landscaping Planting and Children's Outdoor Play Areas |
| C | Civil Engineering |
| A | Architecture |
| S | Structural Engineering |
| M | Mechanical Engineering |
| E | Electrical Engineering |
| G | Geotechnical Engineering |

e. Drawing Designation. Each drawing in the particular division shall be designated by the discipline designation and sheet number (i.e., E-6 is the sixth electrical drawing.) This system as listed will be used in establishing sequence of drawings. The notation system shall be placed in the last increment of the drawing number block entitled "sheet."

f. Ring Number. Consecutive ring numbering shall begin with the cover sheet. Ring number shall be placed in a circle directly below "Sheet" block of the Title Block. Sheets inserted after ring numbers have been finalized shall be designated with the ring number of the original sheet preceding it and an alpha from A to Z beginning with A (i.e., ring 32A follows ring 32).

g. Cross Reference. Cross-referencing for sections and details shall be based on the sheet reference number.

h. Symbols and Conventions. Symbols and conventions serve two main purposes. One is to simplify the drawing and improve comprehension; the other is to follow or establish a standard which is easily recognized. Symbols shall be the standards used by the various disciplines.

ii. Legends. Place legends of symbols and material indications on the drawings. Since many symbols are limited to certain design disciplines, use separate symbol legends on the initial sheet of each design discipline. Symbols in the legend shall be at the same scale or slightly larger than used on the drawings.

# ATTACHMENT 6

# SITE AND LOCALITY MAPS

USACE Design District shall include general site and locality maps in this attachment for information purposes. Maps included in this attachment are not meant to provide driving directions for potential contractors.

# ATTACHMENT 7

# PROJECT AND SAFETY SIGNS

USACE Design Activity to include the size and design requirements for the project and safety signs. Included with this TI are samples which are suitable for adoption at the discretion of the USACE Design District.

# ATTACHMENT 8

# GEOTECHNICAL REPORT

USACE Design District shall include in this attachment the geotechnical report for the proposed housing construction site. This report should include boring logs, a site map identifying bore hole locations, and an engineering analysis of the soils information which makes recommendations and conclusions with respect to the suitability of the existing site soils to support the proposed project.

If the USACE Design District Geotechnical Engineer feels that the site conditions warrant specific mandatory requirements for a particular project, those requirements must be included in the Statement of Work as well as included in this appendix.

# ATTACHMENT 9

# EXCERPTS FROM THE INSTALLATION DESIGN GUIDE

USACE Design District shall obtain from the Installation copies of the Installation Design Guide (IDG). PA/PE shall thoroughly review the IDG with the Installation Project Manager and identify all areas of the IDG which could apply to the construction of the new family housing units. Those pieces of the DG shall be included in the solicitation in this attachment for review, use, and consideration by the contractor.

Complete copies of the IDG inserted in this attachment is discouraged as it will add volume to the solicitation with little additional value added to the project.

# ATTACHMENT 10

# FIRE FLOW DATA

USACE Design District shall obtain from the Installation the flow and pressures available in the domestic water mains adjacent to the proposed development site. If the Installation does not have this information available, the Design District shall take steps to have tests done to secure this information as part of the development of the solicitation.

# ATTACHMENT 11

# LIST OF DRAWINGS

USACE Design District shall include a list of all informational drawings provided as part of the solicitation. Typical drawings include topographic surveys of the proposed site as well as utilities information and proposed tap points for the utilities to serve the new housing development.

# ATTACHMENT 12

# ASBESTOS AND LEAD PAINT SURVEY RESULTS

If the project includes the demolition of existing housing units, the provision of the asbestos and lead survey and testing results is imperative to the success of the project. USACE Design District must include this information in the solicitation.

Typically the Installation can provide this information for inclusion in the solicitation, if this information is not available from the Installation, the Design Distict shall have these surveys conducted and completed during the development of the solicitation.